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To Make Collodion.

This substance is now extensively used in photography to coat the body on which the picture is to be taken. Dr. Maynard—our countryman—was the first to propose an ethereal solution of gun cotton as a substitute for adhesive plaster. Ordinary gun-cotton, however, is somewhat insoluble in ether. It must therefore be prepared by a special method, known as Malgaine's, which gives a perfectly soluble product.

Mix in a stone-ware pan, 40 oz. purified niter in powder, with 60 oz. of sulphuric acid of 66°, and stir in 2 oz. of finely-carded cotton. After three minutes, remove the cotton with a glass rod and plunge it into a large volume of water, and renew the washing with fresh water until the removal of all acidity. Press, dry in a warm room, and pull out the wool. 8 oz. of this cotton form, with 125 parts of rectified ether, a solution which must be diluted with 8 parts of rectified alcohol and strained through a linen cloth.

This liquid is the collodion of the shops, now much used for surgical purposes. It is applied either alone with a brush or upon a linen cloth. Its adhesiveness is said to be increased by the addition of Venice turpentine. The parts to which it is to be applied must be free from all dampness, as water decomposes the collodion.

When containing one grain of morphine to the ounce, it is also a remedy for the toothache.

As the solvent of ethereal of cantharides. it is an admirable blistering-plaster. It may be spread on with a camel's hair pencil. The evaporation of the ether leaves a dry coating in a few seconds; and as soon as the principle of the cantharides begins to act upon the epidermis, the coating rises and forms a blister. If opened at the side, the film of collodion remains unbroken, and by thus protecting the sore, obviates the necessity of dressing it with ointment. Its application to the photographic art, is an English invention, which has now become universal in its application. Collodion is not a good substitute for adhesive plaster, for flesh cuts. if the wound is deep, as the tendency is to shrink up the edges of the wound, and prevent their being brought close together. It is now employed by some physicians, for diseases of the eye, such as the inflamed edges of the eye-lid. It is put on with a camel's-hair pencil; none but a physician however, should apply it, as in the hands of unskillful persons the delicate organ of sight might be positively injured, instead of being benefited.

Asphaltum Pavements.

Asphaltum is being used quite extensively in Sacramento, Cal., both as a water-proof roofing for houses, and as an excellent sidewalk. Its evenness prevents that loud and disagreeable clatter usually produced by vehicles upon rough and unevenly paved streets.

Blue Varnish.

Copal or lac varnish colored with prussiac blue makes a good light blue varnish for the polished iron of new plows, or other agricultural implements, the bright metal of which requires to be protected from rain.

MARTIN'S SELF-WEIGHING CART.

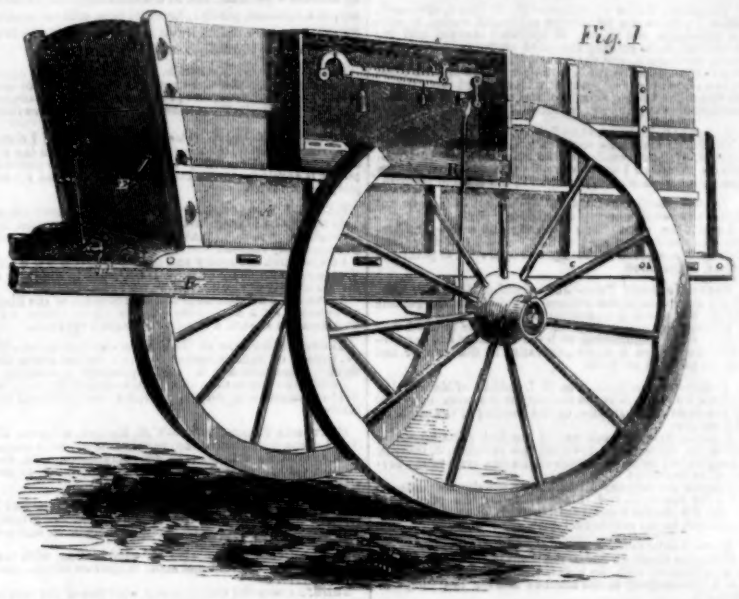


Fig. 1

The accompanying figures represent a cart that weighs its own load, and for which a patent was granted on the 20th of May last.

Fig. 1 is a perspective view of the cart; fig. 2 a view of the cart box turned upside down, to show the under side of it; and figs. 3 and 4 are sections which will be referred to in the description which follows:

A is the box or body of a cart of the common form; B is a frame or truck below it, as shown in fig. 2; this frame, and not the cart box, is secured to the axle, C, of the wheels, which sustains it. The box, A, of the cart, is capable of being raised up by a lever, D E. By turning the lever handle, E, to the one side and applying pressure to it, the box, A, is raised above the truck part, B, as shown in fig. 3. The cams, *f f*, on the lever rod, D, act on the cross compensation levers, F F, which are connected with bar I, fig. 2, and then the four knife edges, *e e*, are forced up against the conical pins, *g*, of the cart box, thus raising it up, and supporting it perfectly true on four points, and the *load* can then easily be weighed as follows:—A lever, R, extends from the stationary frame or truck, B, up the side of the box, A, to the scale box, and is connected by a link to the short end of the weigh beam, S. When the box, A, of the cart is raised by the lever, E D, upon the four knife edges, *e e e e*, of the levers, F F the box and all it contains can then be weighed by adjusting the weight on the beam, fig. 1. When the cart box is not being

Fig. 2

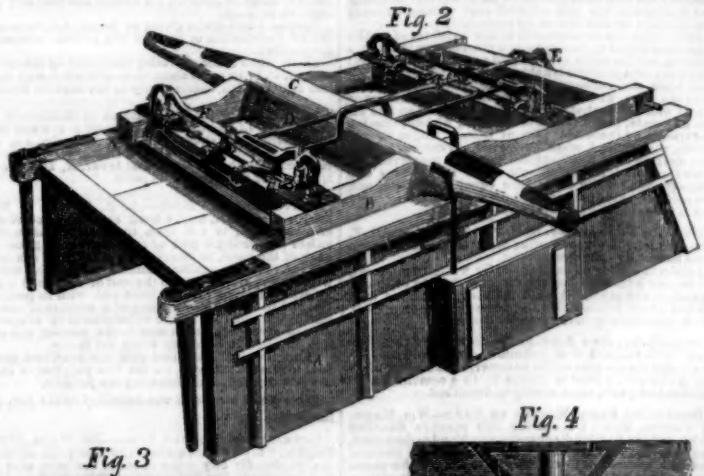


Fig. 3

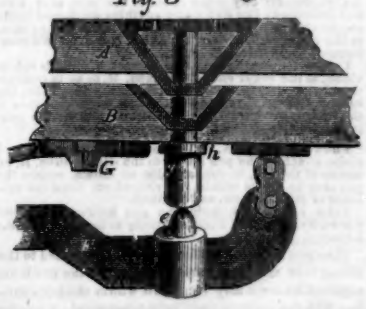
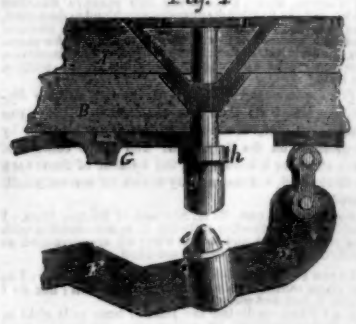


Fig. 4



weighed, the knife edges, *e*, are dropped down and the conical pins, *g g*, of the cart drop into their seats, as shown in fig. 4. To hold the body, A, of the cart firmly to the truck, B, when drawing a load, the pins, *g g*, have each a flange, *h*, and there is a catch, G, for each of these flanges; this catch is forced under the flange, as shown in fig. 4, and locks it securely. When the load in box A is to be weighed, the turning of the lever handle, E, draws out these catches, G G, simultaneously with the action of cams *f f*, on the lever D, to actuate the cross-levers, F F, and lift up the pins, *g g*, as shown in fig. 3. There are four catches, G G, connected to bars, which latter are divided in the middle, and which are operated, in the same manner as spreading open and drawing together a person's arms.

It might be inferred that it would be very difficult to raise the cart box with the lever, E, and that a great amount of power would have to be applied to it; but we have been assured that one man can weigh the contents of a cart for drawing coal, with comparative ease. A self-weighing cart is certainly an acquisition to the public. A person purchasing a tun of coal can weigh it himself in such a cart, and thus avoid being cheated; and so likewise with anything else in the cart from the weight of a few pounds up to tuns. This invention is certainly a useful one, and deserves to come into general use; in fact, its general adoption will no doubt soon be demanded by the public. A few of these carts have been in use in Burlington, N. J., for six months, and have given satisfaction.

The patent has been assigned to the inventor himself, and to Lewis Rothermel, who is about introducing these carts into Philadelphia, in which city, if inquiries are made at No. 80 Walnut street, information respecting them may be obtained; and for further information address Messrs. Martin & Rothermel, at Burlington, aforesaid.

Steamship Burned.—Combustion of Oil Waste.

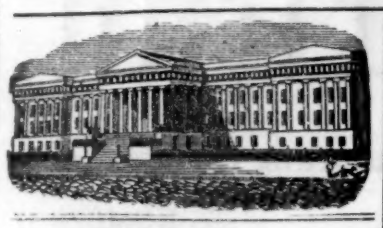
The steamship *Knoxville* was consumed by fire while lying at the wharf in this city on the evening of the 22nd ult. The fire originated in the vicinity of the boiler, and it is thought that the workmen may have accidentally left a lighted lamp in the hold upon terminating their day's work, which ignited some light material lying about.

The *Knoxville* was built about two years ago by William H. Webb, and cost, when completed, upward of $200,000. She had no cargo on board, and was in the hands of workmen from the Novelty Works, who were overhauling and repairing her machinery.

An attempt was made to save the hull by scuttling, but this proved ineffectual, as the vessel, from the shallowness of the water in the dock, soon grounded; she was burned to the water's edge, and may be considered a total loss.

If losses by fire are an index of carelessness, we are the most careless people in the world, for assuredly more property is destroyed by fire in our country every year, than in all the rest of the world besides. Every steamship, every house, and every store burned, is just so much of the accumulated wealth of our people blotted out of existence. The value of the *Knoxville*, at $200,000, is equal to the labor of about 219 men for a whole year, at two dollars per day. All this labor expended on the *Knoxville* was swept away in a few hours. Such losses never can be truly repaired, for the labor spent is also time spent, and that never can be recalled.

The *Knoxville* was insured for $100,000, and was the finest vessel belonging to Mitchell's line of steamers running between New York and Savannah, Ga. The cause of the fire may have been the spontaneous combustion of greasy *waste*, employed for rubbing down the machinery. We are positive that only a very small number of engineers are aware of the rapidity with which some oils oxydize, and thereby engender great heat when spread over an extended surface, as in the cotton waste employed for wiping up the grease on polished machinery. There are numerous instances on record of factories being burned down by the very rapid spontaneous combustion of greasy waste piled together, just as we have frequently seen it in some engine rooms. All persons using oil waste, in factories and on board of steamers, should be instructed not to leave it in a dangerous place, nor to lay it up in a pile.



Important Notice.

When an individual has made an invention, the first inquiry that naturally suggests itself is, "*Can I obtain a Patent?*" A *positive* answer to such questions is only to be had by presenting a formal application for a patent to the government, embracing a petition, and oath, specification, model, two drawings, and the payment of the official fees. Aside from these steps, all that the inventor can do is, to submit his plans to persons experienced in the business of obtaining patents, and solicit their opinions. If they are honorable men, he may confide to them his ideas with perfect safety, and they will inform him whether or not they regard his invention as patentable.

Those who wish to consult with ourselves on such matters, are at liberty so do so, either in person, at our office, or by correspondence through the mails. For such consultations we make *no charge*. We shall be happy, at all times, to examine inventions, and will give conscientious opinions as to their patentability.

Pen and ink sketches of the improvement, and a written description of the same, should be sent. Write plain; do not use pencil or pale ink, and be brief. Remember that all business committed to our care, and all consultations are kept by us secret and strictly confidential.

Parties wishing to apply for patents are informed that they can have the necessary drawings and documents promptly prepared at this office, on the most reasonable terms. It is not necessary for them to go to the expense of a journey in order to be personally present. All the required business can be just as well arranged by correspondence. Models may be sent by Express.

We have been engaged in the business of procuring patents for years, and have probably had more experience than any other firm in the country, owing to the fact that the amount of business done by us equals, if it does not exceed, that of all other professional patent agents in the United States combined. A large proportion of all the patents annually granted by the American government, are prepared and conducted by our firm—We have in constant employment an able corps of examiners and draughtsmen, whose duties are so systematically arranged, under our own personal supervision, that every case committed to our care, receives the most careful study and attention, and the most prompt dispatch. In every instance we endeavor so to draw up the claims and prepare the whole case, that the patent, if granted, will stand the test of the courts, and be of value to the owner. Patents secured through our agency are scattered all over the country, and in this respect they speak for themselves.

In addition to the advantages which the long experience, great success, promptness and moderate charges of our firm, in obtaining patents, present to inventors, they are informed that all inventions patented through our establishment, are noticed editorially, *at the proper time*, in the SCIENTIFIC AMERICAN, without charge. This we are enabled to do from the fact that, by preparing the case, we become familiar with its peculiarities. Our paper is read by not less than 75,000 persons every week, and has a wide-spread and substantial influence.

Inventors, we believe, will generally promote their own interests by confiding their patent business to our care.

MUNN & CO.,
128 Fulton street, New York.

[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING DECEMBER 23, 1856.

STOVES AND FURNACES—Theo. Cook, of Springfield, Mass.: I claim the fire chamber or pot, A, chamber C, and cases D E, provided with the necessary pipes, and arranged relatively with each other, as shown and described, for the purpose specified.

[This is a combination air-heating furnace and radiating stove. The different flues and chambers are so formed and arranged that a great quantity of air can be heated for distribution, to heat other apartments than the one in which the stove is placed, while, at the same time, the heat is radiated in a very perfect manner. This is a good improvement; it is a very compact and convenient stove and heater.]

CUTTING INDIA RUBBER THREAD—Henry Davenport, of New York City: I claim the combination of the cylinders or drums, B B', over which the endless belt of India rubber, from which the thread is to be cut, is stretched, with the revolving circular cutters, E E', attached to the table, D, the whole arranged, constructed, and operating in the manner described.

HAND PRINTING PRESS—Platt Evans, Jr., of Cincinnati, O.: I claim so connecting the platen with the follower, that the upward motions of the follower shall remove the platen from the ink pad, and bring it back again, and during every alternate downward motion of the follower, the platen shall remain over the ink pad, and under the type follower.

I claim the mode of communicating the motions of the follower to the platen, the same consisting of the double inclined guide, a, with its stops or checks, b b', and the forked toggle, N, operated by spring M, and having bearings in the short arm of the lever, A, as set forth.

LOOMS—A. L. Fuller, of Clinton, Mass.: I do not claim controlling the feed or take-up motion of a loom, as has been before done, but only in connection with the devices and arrangement described.

First, I claim regulating or changing the feed, by governing the action of the lever, C, by means of the graduated stop, F, or its equivalent, in connection with the change of slide and pattern, in the manner and for the purpose set forth and described, or any other substantially the same.

Second, I claim the guard, R, for lifting the fingers, when constructed and operating in the manner and for the purposes described.

Third, I claim the flexible connection between the stop F, and the rod or slide, to give motion to the stop without moving the slide, as described.

PAPER PULP ENGINE—Joseph Kingsland, Junr., of Franklin, N. J.: I claim the method of regulating the feeding of the fiber to the grinder by varying the hydraulic pressure, by means of an adjustable discharging nozzle, or its equivalent, as set forth.

HEMP BRAKES—Edw. W. Lacy, of Oak Park, Va.: I claim the adjustable weight, F, to be used with or governed by a treddle roller, or its equivalent, to regulate at pleasure the momentum of the blows upon the stalks, as described.

SPRING HINGE—J. T. Garlick, of New York City: I do not claim the use of a hinge with springs attached thereto, so that the article to which it is attached may be adjusted to different distances from it.

I claim a hinge, or series of hinges, attached to a double leafed spring, in the manner described and for the purposes set forth.

HOOF EXPANDER—C. B. & S. Galentine & A. J. Russell, of Nunda N. Y.: We claim the application of the instrument described, or any other substantially the same, worked by a thumb-screw, or other form of lever, so small as not to interfere with the operation of nailing the shoe to the hoof of the animal.

MOWING MACHINE—A. M. Hall, of West Falmouth, Me. do not claim hinging the cutter bar to the main frame by a hinge connection, in order to enable the said bar to accommodate itself to the ground it may pass over.

I claim operating the pitman, H, by means of the mechanism described, when the same is constructed and arranged in the peculiar manner and for the purposes set forth.

TRIMMING CARD CLOTHING—E. B. Howe, of Lowell, Mass.: I claim the adjustable guide and clamp, R, with its adjustable tool holder, M, operated thereon, and the guide bar, J, for guiding the card clothing, by the card teeth set therein, and the points, i, in this bar, J, to hold the card clothing, while it is being trimmed on both edges at the same time, and parallel with the card teeth therein, these parts being arranged and operated in the manner and for the purposes set forth.

BEDSTEAD FASTENINGS—Sandy Harris, of Philadelphia, Pa.: I claim the combination, substantially as described, of the dovetail with the staple or mortised projection, E, which I have termed the wedge box, and its key acting upon an inclined face, in the manner set forth.

PLOWS—Jacob Heckendorn, of Elkton, Md.: I do not claim a reversible or self-sharpening point.

I claim the twisted, four colored, double-ended and reversible, self-sharpening point, F F F F, as described, formed of one piece or casting, and operating as a point and colter, as specified.

POINTING SHOE PEGS—Jesse Ladd, of Holderness, N. H.: I do not claim the triangular knife; nor the guiding ridges, B B and C C C, nor the feed roller.

I claim the employment of the fluted or toothed feed roller, D, in combination with the vibrating bed composed of the fingers, A A, &c., operating in the manner and for the purpose set forth.

SEWING MACHINES—Wm. B. Landfear, of Manchester, Conn.: I do not claim the forming of the seam by means of the needle and shuttle, or the feeding of the cloth by the needle.

I claim, first, the manner of regulating the length of stitch, by raising and lowering the fulcrum, J, thereby changing the relative lengths of the two arms of the lever, G, as described

I claim the manner of combining the shuttle guide, R, with the crank, E, and fulcrum, N, for the purpose of giving the shuttle a downward motion, when the stitch is tightened, in the manner set forth.

DOOR FASTENER—James Letort, of Wytheville, Va.: I claim the employment of the bent lever bolt, 4, when in combination with the blade, 1, or the additional blades 2 or 3, substantially in the manner and for the purposes set forth.

BLACKSMITH'S CRANE—Wm. Maher, of Slack, Ky.: I claim the horizontal bar, E, hung upon the screw, C, and used in connection with the windlass, D, the above parts being arranged as shown, for the purpose specified.

[This crane is principally designed for blacksmiths, and heavy shops where heavy forging is executed. It is well adapted for raising heavy shafts, and such articles, to the fire, taking them from it, and then adjusting them on the anvil. It is a portable and compact crane, not expensive, very convenient for any forge, and not liable to get out of repair.]

R R. PLATFORM SCALES—Lea Pusey, of Downington, Pa.: I claim a railroad scale, in combination with either a permanent or subsidiary track or siding, so that a locomotive or cars may be passed upon the said scale; not simply approximating two tracks of a railroad, so that a locomotive or cars may be switched from one to the other, irrespective of the combination and arrangement of the same with the platform of the scale, as described so as to avoid both the crossing of the track, and the consequent use of a frog, or its substitute; nor do I claim supporting part of a railroad track upon posts or supports of any kind, arranged so as to pass up through roomy holes, made in the platform of a scale, so as to admit a locomotive or cars to pass over the same, without bearing upon the scale, irrespective of the peculiar arrangement and combination of the same with the scale, as described, whereby the said scale is adapted for receiving, weighing and discharging the said railroad cars without crossing the track, or using a frog or its substitute.

But I claim the arrangement of the platform of a railroad scale either in the main or a subordinary track of a railroad, substantially as described and set forth; so that when the said platform is not in use for weighing as a railroad scale, the locomotive and train may pass directly over the same, without bearing upon the said platform or scale; and also so that the cars may be passed on and off the said scale, in the course of weighing without crossing the track, and therefore without using a frog or its substitute, as described, whereby all the advantages heretofore derived from a siding constructed for preserving the scale from the injurious effects of the locomotives and trains passing rapidly over it, are equally attained, and the room and expense required for the construction and use of the said siding entirely avoided.

HOT AIR FURNACE—J. H. H. Perkins, of Utica, N. Y. I do not claim the superheating of steam, as this has been done before, for other purposes.

I claim the mode of heating air, for warming purposes, by passing it through the hot air chamber, in close subchambers and pipes, the main chamber being filled with air and steam, commingled and heated by the furnace or stove, substantially in the manner described

BREECH-LOADING FIRE-ARMS—Hermann Schroeder, Louis Salewski and Wm. Schmidit, of Bloomington, Ill. We claim the cocking of the hammer, in the act of moving the barrel forward to charge it, by a combination of mechanical parts, substantially as described.

OPERATING FLUID METERS BY HAND—Wm. Mason, of Warren, Mass.: I claim the two concave flanched disks, and the flexible diaphragm, combined as described, and provided with any suitable arrangement of passages and with a faucet, or its equivalent, to change the passages, to admit water to each side of the flexible diaphragm alternately, the whole operating as and for the purpose set forth.

[This water meter contains an interior flexible diaphragm which divides it into two chambers; the water flowing into one, discharges the water in the other by its pressure on the diaphragm. The cubic contents of each chamber is known, and the number of times each is discharged, and the quantity drawn off correctly indicated.]

CORN SHELLERS—E. M. Stevens, of Boston, Mass.: I claim the self-adjusting cylinder, f, in combination with the presser bar, i, and bed k, when all are arranged as set forth, and for the purpose specified.

TRUSS PADS—S. J. Sherman, of New York City: I do not claim setting truss pads to a given position; nor do I claim a ball and socket joint.

But I claim rendering the joint of truss pads, rigid in any desired position, by compressing the ball between two plates, as described.

PREPARING VEGETABLE FIBERS—Werner Staufen, of Prussia. Patented in England Nov. 2, 1855: I claim as a new manufacture, as an article for stuffing mattresses, cushions, &c., produced by permanently curling any suitable vegetable fibrous substance, by the method substantially as set forth.

CONNECTING SHAFTS WITH AXLETREES—Alfred E. Smith, of Bronxville, N. Y.: I claim connecting the thills or shafts of a carriage, with the axletree, by means of journals of greater diameter than the thickness of the plate from which it projects, and the said journals being fitted to holes in the ears, one of which ears is provided with a slot of less width than the diameter of the journal fitted to its hole and large enough to allow the plate to slide in it freely, for the purpose and in the manner described.

HOSIERY—Wm. H. McNary, of Brooklyn, N. Y.: I do not confine myself to the use of any particular machinery to produce the results described.

I claim the production of the heels and toes of hosiery by knitting a spherical piece on the cylindrical or straight portions of the leg or foot, by the mode of operation described, whereby the same number of stitches is always left remaining on the needles, and the cylindrical or straight portion is enabled to be proceeded with again, when desired, thus enabling the whole leg and foot to be produced by a continuous operation of the devices or machinery employed.

[This is a very ingenious and beautiful improvement in the art of stocking-knitting. The operations can be performed by either a straight or circular knitting machine, with more advantage by the latter;—by it a perfectly seamless and well-shaped stocking can be produced. The claim describes the nature of this improved method of knitting the heels (and toes also) of a stocking by knitting a peculiar, but, at the same time, simple manner, of a rounded, partly spheroidal form without a seam. Stockings can be knit more expeditiously, and of a better shape by this principle of operation.]

MELODEONS—G. O. Spence, of Elmira, N. Y.: I claim the application of the third pedal to the receiver of melodeons, for facilitating the production of the crescendo and diminuendo in the manner and for the purpose fully set forth.

CIDER MILL—Harry Abbott, of Huron, N. Y.: I claim the arrangement of the small pressing rollers, in the arc of a circle, upon vibratory arms, to which the pressing power is applied, substantially in the manner and for the purposes set forth.

TINNERS' SHEARS—Levi Skeels, of Ostrander, Ohio: I do not confine myself to the precise arrangement described, but propose to make such modifications as experience may suggest.

I claim, first, the rotary and sliding clamp, n o p q r, in the described combination, with the straight shears, c d, for the cutting of circular forms, as explained.

Second, the arrangement and combination of the hinged bench, e f g, 2, 4, with the fixed bench or frame, b b', and with the shears, c d, for the purposes set forth.

SECURING BRACES IN GRAIN CRADLE SNATHS—W. W. Bryan, of Schaghticoke, N. Y.: I do not claim the form or construction of the bolt, separately considered.

I claim the application of a wedge-formed bolt or pin, in the manner and for the purpose set forth and described.

PORTABLE FIELD FENCE—W. B. Burnett, of Lyons, N. Y.: I claim constructing the panels of a portable fence, with alternately abutting rails, in combination with the binding clamp, D, in the manner substantially as described.

FOLDING PAPER—C. O. Crosby, of New Haven, Ct.: I claim the combination of the blades with the griping bars, when constructed, arranged and made to operate substantially as described.

Second, I claim the blades in combination with the fingers, when combined and made to operate substantially as described.

Third, I claim the cutting away a portion of the face of one of each pair of the griping bars; and also of the edge of each of the blades, as shown, so that they may gripe the paper without winding the blades, when constructed and used substantially as described.

ROTARY EGG BEATERS—Ralph Collier, of Baltimore, Md., assignor to A. H. Reip and himself: I claim vertically revolving stirring blades, made of metallic wire, arranged as described, and when attached to a central shaft operated in the manner set forth.

PLOWS—Jonathan Adams, of Eatonton, Ga.: I claim the peculiar manner of holding the slotted mold board, share, or hoe, to the stock A, viz., by means of the curved brace, B, with its shank and shoulders extending from the beam B, and against and through the hoe and stock as set forth.

STEAM BOILERS—Jno. Armstrong, of New Orleans, La.: I claim the series of cylinders, A A, placed vertically in rows, with a series of horizontal flues passing through each row, and lying in the vertical plane cutting the center of each cylinder—the space between each row of vertical cylinders being closed at the top by a horizontal flue boiler, all the vertical cylinders being connected together at the top and the bottom and the furnace being located in one end of the space between the rows of vertical cylinders, the whole being arranged, substantially as and for the purpose described.

PRINTING PRESSES—G. H. Babcock, of Westerly, R. I.: I claim, first, attaching the bed and platen together by means of the joint, e, or its equivalent, when each is made to oscillate from a fixed center, substantially in the manner set forth.

Second, I also claim giving an impression, by means of the joint oscillation of the bed and platen, substantially as specified.

Third, I also claim operating the frisket by means of the weight, o', or its equivalent, in combination with the motion of the platen, substantially in the manner described.

TRIMMING BOLTS—Wm. Hannah, of Middlefield, N. Y. (assignor to L. H. Bowen and himself): I claim the arrangement of the sliding and stationary dies, a a, as described, and operating with the sliding face plate, B, in connection with the horizontal lever, A, and eccentric lever, C, for the purpose set forth.

PORTABLE HEAD RESTS—A. B. Wilson, of Waterbury, Ct.: I claim, first, a head rest composed of a pad or other piece, to rest upon the back and shoulders or either supporting a pad of proper form to receive the back of the head, as described, or other wise constructed in a substantially similar manner, to support the head without any attachment to the seat or any fixed object.

Second, making the said head-rest, with its pads flexible, and its supports, consisting of a number of independent or unconnected ribs, C C, substantially as specified, so as to give the greatest ease to the wearer, and enable it to be rolled or folded up when not in use.

Third, the sling combined with the head rest, as specified, to receive the arm, for the two purposes of keeping the rest in place, and protecting the pockets.

[This useful invention was described in the SCI. AM. of last week.]

LUBRICATING SPINDLE STEPS—Jos. Welsh, of Philadelphia, Pa.: I do not claim introducing the oil through the spindle, directly to the inside of the tube, as set forth and described; nor do I claim anything contained in the patent of E. W. Welch, dated Jan. 28, 1840; nor anything in the application of Joseph Turner and E. S. Webster, rejected respectively in 1848 and '49.

I claim making the groove or grooves, h, or their equivalents, at the lower end of the tube, E, so as to conduct thereby, during the rotary motion of the said tube, the surplus oil from the spindle, A, to the horizontal face of the step, B, substantially in the manner and for the purpose set forth and described.

FOUNTAIN PEN—A. F. Warren, of Brooklyn, N. Y.: I claim attaching the pen holder to the sliding tube, B, by means of the rod, C, substantially as shown, so that the pen may be drawn within and shoved out from the cylinder or ink reservoir, as described.

I also claim constructing the pen holder of the two plates, b c, and plug, D, substantially as described and set forth.

[The pen holder of this fountain pen is attached to the sliding tube, and is so arranged, that when the pen is not required for use it may be drawn within the ink chamber. The pen holder is peculiarly constructed; it has two small plates which support the pen and serve as ink feeders. This improved fountain pen is very neat, compact, and simple.]

KNITTING MACHINES—Clark Tompkins, of Troy, N. Y.: I claim the improvement of driving the rough roller A, of the take up mechanism of a rotary knitting machine, by means of rotary friction plates, or their equivalents, substantially as described, instead of giving a positive rotary motion to this roller, as heretofore, so that the draft roller, with its incumbent take-up roller, B, without any additional mechanism, or any re-adjustment continually gives the same tension to the web, in knitting, however much the yarn varies in size, or whether much or little yarn is fed to the needles, or whatever quantity of web is on the take-up roller.

HANGING SAWS—Jno. Stowell, of Charlestown, Mass. I do not claim attaching the ends of the saw to the two levers, E E, for this device, or its equivalent has been previously used.

I claim attaching the saw, J, to the two levers, E E, when the axes of said levers are fitted in an oscillating frame, D, the journals of which are fitted in slots or grooves, or in a swinging frame, C, to allow a forward and backward movement of the frame D, as described.

[This is an improvement in hanging muley saws. The ends of the saws are attached to parallel levers, the axes of which are placed in an oscillating frame, the journals of it being fitted in a swinging frame, and the levers are so arranged and combined that the saws can be strained with great facility, and made to operate in a perfectly vertical right line.]

SHIRTS—S. H. and Joseph Strouse, of New York City. We do not claim the formation of the sweep or the arched profile from the neck to the shoulders of shirts, by means of inserted pieces, such as gussets.

We claim the yoke, a, constructed as described, with curved springs, C d, in combination with the manner of attaching the same to the back of the shirt, with the gathers in the center, as set forth.

WEIGHING SCALES—Elnathan Sampson, (assignor to the Vergennes Scale Manufacturing Company,) of Vergennes, Vt.: I claim the peculiar arrangement and operation of the respective parts of my improved compound weighing poise, viz. combining the outer portion, b, of said poise with the main portion, a, thereof, in such manner that the act of rotating the outer portion of the poise will move it longitudinally upon the main portion thereof, by a graduated movement, and at the same time indicate the different leverage action thereby produced upon the scale beam by means of a toothed horizontal index on the main portion of the poise, and a spiral groove and a numbered spiral scale on the periphery of the outer portion of the poise, whilst the entire poise can be moved longitudinally upon a rod, situated immediately above the scale beam and the leverage exerted by said poise, when its respective parts are compactly united, is indicated by a vertical index, descending from the main portion of said poise, immediately in front of the numbered scale of the scale beam, all substantially as set forth.

CONVERTING RECIPROCATING INTO ROTARY MOTION—Samuel Glasinger & John W. Keilberg, of Allegheny City, Pa., assignors to D. A. Morris, of Pittsburg, Pa.: We claim the combination of the disk, A, having an externally notched rim, a, and being attached to the shaft to be rotated, the standard, F, or its equivalent, containing a double arc-formed slot, d d', the bar, E, that is connected by a vibrating rod, C, with the piston rod or other reciprocating object, the pin, c, the levers, G G, and springs, j j, the whole operating substantially as and for the purpose specified.

[This improvement is for converting reciprocating rectilinear into rotary motion, and vice versa. The devices employed for this purpose, and the manner in which they are arranged, are stated in the claim. For many purposes, as substitutes for the crank and the common eccentric, other devices are more convenient; to effect such a result is the object of this invention.]

BURNING CHARCOAL—Andrew Grimes, (assignor to Charles Day,) of Lancaster, N. Y.: I claim burning wood in the open air, without any covering of earth, or any substitute therefor, in such a manner as to reduce any given amount of wood to a mass of red hot coals, preventing the pile from burning to ashes until the result is accomplished in the manner set forth.

SIZING HAT BODIES—Sylvester H. Gray, (assignor to himself and Francis Ives,) of Bridgeport Conn.: I claim attaching the guide, h, to the rear end of the vibrating carriage, b, in the manner described, for the purposes specified.

Second, I claim the use of the adjustable steam chest, d, in combination with the vibrating carriage, b, and the revolving endless bed, c, on carriage, b made and operating substantially in the manner and for the purpose specified.

LOOMS—Benjamin G. Dawley, (assignor to Z. Allen,) of North Providence, R. I.: I claim the use of an intermediate wheel, D, or wheels, to balance and regulate the tension in the delivery of the warp from two or more yarn beams combined together, to form one web of wide cloth, substantially as described.

AUTOMATIC RAKES FOR HARVESTERS—Samuel Comfort, Jr., of Morrisville, Pa., assignor to Edward S. Renwick, of New York City: I claim, first, the combination of the rake handle, the guide which its upper end traverses, and the lever to vibrate the rake in and out, when arranged for joint operation, substantially as set forth.

Second, the counter loading of the rake, for the purpose of rendering the draft of the machine more equable, substantially as set forth.

Third, the combination of the rake with the mechanism for moving the same to and fro over the platform with a traversing carriage, substantially as set forth.

Fourth, the method of discharging the gavel before being bound by dropping it from between the rake teeth, V, and the plate, H, while the machine is in motion, as if it were standing still, by neutralizing the forward motion derived by the gavel from the machine by its backward motion derived from the rake, substantially as set set forth.

Fifth, the combination of the rack and pinion, or the equivalent thereof, with the rake, substantially as set forth, whereby the motions are generated for traversing the rake, first along the platform to gather the grain into a gavel, and then across the platform, to discharge the gavel.

CUTTING VENEERS FROM THE LOG—Joseph H. Goodell, of Bridgeport, Conn.: I am aware that the same character of double movement of the stuff to be operated on by a fixed knife namely, combining with the curvilinear movemen of the stuff, a simultaneous lateral action or drawing stroke, by means of a hinged frame or table, working in connection with fixed guiding strips is common to stave cutting and other similar machinery, such, therefore, I do not claim.

But I claim in veneer cutting the combination and arrangement shown and described of the reciprocating log carrying slide, B, unsupported by trunnions or axles for its curvilinar play with the fixed guiding strips, c, and stationary knife, D, when said guiding strips serve as the sole guide to give to the log carrier, operated as specified its curvilinear movement, and simultaneous side action, as and for the purposes set forth, and whereby a steadier and more reliable double bearing is given to the log in its two movements the log may be secured with facility to the carrier and the driving power is communicated to the log, in a more positive and direct manner for cutting with increased ease and precision thin veneers, as set forth.

I also claim hinging the knife holding frame, G, to the main knife-feeding slide or frame, H, for the easy and double adjustability of the knife, as shown and described.

ADJUSTING THE BITS OF CARPENTER'S PLANES—Thomas D. Worrall, of Lowell, Mass.: I claim the arrangement of the rack and pinion and the clamp, so that while the pinion is placed within the clamp, the rear or dovetailed sides of the rack bar shall serve as bearings for the clamp to work against.

SPRING BED BOTTOMS—Elkan Adler, of New York City: I claim the combination of the metal caps, connecting links or straps, and springs, in the manner and for the purpose set forth.

FEEDING PAPER TO PRINTING PRESSES—Moses S. Beach, of Brooklyn, N. Y.: I claim turning the sheet and delivering it to the impression cylinder for a second impression, by means of an extra or second cylinder, or its equivalent, substantially as described.

I also claim the arrangement and construction of the twin fingers, J M, operating substantially as described.

HORSE FASTENING—James Bolton, of Richmond, Va.: I claim the combination of a ratchet wheel with the hub of a wheel of a vehicle and with a tie rein capable of adjustment so as to bear equally upon both sides of the bit of a horse or other animal used for draught, whereby the rein is drawn and the animal is checked if he move forward, and the rein is loosed if he move backward, as set forth.

HARVESTING MACHINES—Joseph Carpenter, of Yorktown, N. Y.: I claim the employment or use of the two levers, F G, connected by the strap, j, and attached to the frame, A, and bars, d g, to which the wheels, D E, are attached as shown, for the purpose set forth.

SEED PLANTERS—N. C. Sherman & J. Mason, of Hazle Green, Wis.: We disclaim the wedge-shaped jaws, to be opened after having been thrust into the ground, thus forming a pocket or cavity into which the seed may fall. Devices of this kind are old, and an example is seen in Hushes' patent, Nov., 1855.

We claim the double plunger, E, having bars, F G, operating and combined with the seed box, A, and jaws, B C, in the manner substantially as set forth.

[This improved planter has a double plunger, composed of two bars united at their upper ends into one handle, while their lower portions are separated One of the bars passes through the seed box and lifts a certain quantity of seed from it at each stroke; the other bar opens the jaws at the base of the implement, allowing the seed to drop down, and then presses it gently into the soil. It is an excellent hand planter.]

SEWING MACHINES—A. F. Johnson and F. A. Houghton, of Boston, Mass.: We do not make any claim now to the manner of vibrating the needle arm by means of an eccentric stud working in the slotted arm.

But we claim the described arrangement of parts of a spring power mechanism, where combined with a sewing machine, and located in a box forming the pedestal of said machine.

We also claim the device by which the machinery is made self-regulating, as to speed, consisting of the lever, U, brake, u, in combination with the fan wheel, a', attached to the loose collar, c', in the manner described, and operating as set forth.

GRINDING PAPER PULP—Joseph Kingsland, Jr., of Franklin, N. J.: I claim the process of reducing fibrous matter in water to pulp, by grinding it under hydraulic pressure, which creates a current that feeds the fibre into the grinder, and removes it therefrom as fast as it is sufficiently reduced, and renders the feeding independent of the grinding, substantially as set forth.

SMOKE CONSUMING FURNACES—John Case and Isaac Soules, of Amsterdam, N. Y.: We claim, first, the arrangement of the fire and smoke chambers, the direct and the return flues, the gas and the air pump, the pipes to supply air above and below the grate, and the waste pipe for the spent gases, substantially as described.

Second, the combination with the smoke chamber and direct and return flues of the diaphragms, to direct the gases downward and backward as they enter the smoke chamber, to facilitate the precipitation of the sparks and thoroughly oxydated gases from those gases which are but partially burnt, and require for the completion of their combustion to be returned to the fire chamber.

Third, the arrangement at or near the bottom of the smoke chamber of an open orifice, for the free and constant escape of the waste gases in combination with the smoke chamber and direct and return flues, substantially as set forth.

Fouth, in combination with the smoke chamber, arranging the hot gas and cold air pumps, substantially as described.

HAY RAKES—John J. Squire, of St. Louis, Mo.: I claim the clutch, and levers operating the same, in combination with the arm, F, of the rake shaft, and the connection between said arm and lever, B, whereby the rake is lifted by the moving power, and automatically released, substantially as specified.

CALLENDER ROLLS—John Worsley, of Providence, R. I.: I disclaim the manner or form of making the rollers for that has long been in practice by manufacturers of other rolls.

I claim the use and employment of the husks of maize (indian corn) for making rolls, instead of cotton wood, paper, or any other substance now in use.

REFRIGERATORS—Charles Winship, of New Haven, Conn.: I claim the method described of causing the fresh, cold, moist air to perform the combined double function, first, of ventilating and refrigerating the interior of the provision chamber, and then of protecting the exterior of said chamber, as set forth.

[The air in this refrigerator is maintained cold and moist, and permeates with a brisk circulation through the provision chambers. The moist air is maintained at a low temperature to prevent decomposition, and its nature prevents its carrying off any of the juices or sap of the provisions in the chambers, thus preserving them with all their original taste and flavor.]

SEWING MACHINES—Jerome B. Woodruff, of Washington, D. C.: I claim, first, the construction of a feed bar, g, sliding in a dovetail or slotted guide, and moved by a lever, E, connected with the feed bar, g, by a swivel joint or its equivalent, so as always to move the feed bar, g, in a plane with the material being sewed, the feed bar, g, being moved back the distance required for the length of the stitch while the needle is in the material, and when the needle is withdrawn is moved forward, carrying the material therewith

Second, the arrangement of a series of pins, through which the needle thread is laced, for the purpose of giving a uniformity of tension without affecting its twist, or their equivalent.

Third, I am aware that needle bars have been made to vibrate in the arc of a circle, which I do not claim.

But I claim a balanced needle bar for sewing machines when constructed in the form of a segment of a circle, operating the shuttle driver by one end direct, and carrying the needle by the other end, when the whole of said bar forms the arc of a circle, of which the point of suspension is the center, as described.

Fourth, a slotted shuttle driver, the same being operated direct from the needle bar, and so arranged that the shuttle may pass through the loop of the needle thread in its proper time, gradually decreasing its speed, and stopping at, or about the same time with the needle, as described, or its equivalent.

Fifth, I do not claim carrying the shuttle back and forth by two pins, one at the heel and one at the point, independent of a shuttle carrier, for this has been done by Messrs Blodgett & Lerow, and patented to them.

I claim carrying the shuttle back and forth by a single pin, as described.

SOWING SEED BROADCAST—E. K. Haynes, of Hanover, N. H., assignor to himself and A. M. Mowe, of Lebanon, N. H.: I claim the scattering wheel armed with air agitating wings, when located between obliquely-arranged parallel directing boards, n n, for the purpose substantially as set forth.

[It has been difficult to obtain an even distribution of the seed in broadcast sowing by machinery. This improvement, combining the use of fans with the distributing wheel, and an adjustable bottom connected with the hopper, for regulating the discharge of seed, renders it very accurate in its operations, while, at the same time, parts are few, and not liable to get out of order.]

COUNTING MACHINES—James A. Bazin, of Canton, Mass.: I do not claim operating a series of numbering wheels by a corresponding series of mutually dependent pawls, when the pawls are arranged upon the outside of the wheel

But I claim the described arrangement of the numbering wheels, and the parts immediately connected therewith, that is to say, hanging the pawls to the central drum within the rings, and operating them in the manner substantially as set forth.

RE ISSUES.

MAGAZINE, REPEATING, AND NEEDLE GUN—Edward Lindner, of New York City. Patented June 27th, 1854: I do not claim the barrel, B, containing the charges.

But I claim, first, the application of the rack, E, situated between the gun barrel, A, and the cartridge barrel, B, and the construction of the piston, W, in connection with said rack, for the purpose of passing the cartridge into the revolving breech piece, substantially as described.

I do not claim the needle, for the purpose of igniting the priming.

But I claim, secondly, the spiral spring round the needle, together with the jointed arm, b, at the upper end of the hammer, L, constructed as set forth, and acting upon the needle in such a manner that after said jointed arm has pressed the needle sufficiently far into the cartridge to ignite the priming, said arm is forced upwards, allowing, thereby, the needle to spring suddenly back, and pass under the arm by the action of the spring, by which any heating of the needle is prevented.

I do not claim the revolving of the breech piece by the pin V, in the manner substantially as described, i. e., when the said pin is so constructed and arranged that it will rotate after the revolution of the breech piece, and turn over at the moment it shall have passed the spiral groove, and return to its former position inclined, as described.

Fourth I claim the ramming hammer, M, worked in the manner and for the purpose set forth.

MAGAZINE, NEEDLE, AND REPEATING GUN—Edward Lindner, of New York City. Patented June 27th, 1854. Re-issued on division: I do not claim the igniting needle or the revolving cylinder, separately considered.

But I claim the combination of the igniting needle with the revolving cylinder or breech piece, when constructed, arranged, and operated in such a manner that the needle can only be projected when the proper aperture is presented to it, and will always be withdrawn previous to the revolution of the cylinder, substantially as described.

MANUFACTURING CARPETS—John G. Macnair, of Norwich, Conn. Patented Aug. 7th, 1855: I claim the fabric, substantially as described, produced by the double wefts, one or both of which are parti-colored, in combination with the two sets of warps, one to divide and ingrain the wefts, and the other to bind in the wefts, substantially as and for the purposes specified.

MOLDING PLANE—Thomas D. Worrall, (assignee—through Mifflin Paul—of Thomas Worrall,) of Lowell, Mass Patented August 7th, 1854: I claim the combination of a separate molding part or slide with the handle supporting part or body of the plane, and applied thereto by means of plates and screws, or equivalent devices, substantially as specified, and for the purpose not only of enabling it to be removed from said handle part or body, but to allow another such a slide, provided with a plane iron or cutter, whatever may be its pattern to be used in the application of, or in combination with such handle part or body, as circumstances may require.

REAMING AND TAPPING GAS FITTINGS—Henry A. Chapin, of Springfield, Mass. Patented July 1st, 1855: I do not claim a tool holder which can turn independently of the jaws which hold it, as in a shoemaker's punch

Nor do I claim a revolving tool holder, capable of holding and operating a variety of tools, one at a time, as in an ordinary bit stock

But I claim the combination of the tool holder with its spindle, when the said tool holder is armed with its compliment of bits or tools, and is capable of being turned upon an axis, at right angles to, and independent of the axis of the spindle, so that either tool may be revolved in the axis of the spindle, substantially in the manner and for the purpose described

Second, I claim the rotating tool holder, as constructed and operating in combination with the revolving chuck or clamp, S, for holding the fitting, the whole being arranged in the manner substantially as set forth, for the purposes described.

ADDITIONAL IMPROVEMENT.

BREECH-LOADING FIRE-ARMS—Abner N. Newton, of Richmond, Ind. Patented June 27th, 1854. Additional improvement granted June 17th, 1856: I claim, first, the combination of lever, E, with the breech pin, substantially in the manner and for the purposes set forth.

Second, I claim one or more lips, C, in combination with the breech pin as set forth.

Third, I claim cocking the gun by the tension lever, J, as described.

Fourth, I claim forcing the part m, or its equivalent, between the main spring and barrel, for the purpose of imparting tension to the main spring.

Fifth, I claim relaxing the main spring by removing the part m.

Sixth, I claim attaching the main spring, H, to the barrel.

Seventh, I claim the combination of the hammer, F, with the barrel, by means of supports, G, as shown.

Eighth, I claim sliding the breech pin, L, wholly within the barrel, as shown.

DESIGNS.

COOKING STOVES—S. W. Gibbs, of Albany, N. Y., assignor to G. W. Ball & Co., of Cincinnati, O.

COOKING STOVES—Garrettson Smith & H. Brown, of Philadelphia, Pa.

PARLOR GRATES—John T. Davy, of Troy, N. Y.

COOKING STOVES—John T. Davy, of Troy, N. Y.

PARLOR COOKING STOVES—John T. Davy, of Troy, N. Y.

METALLIC BEDSTEADS—John B. Wickersham, of New York City.

FLOOR CLOTHS—Antoine Glominski, (assignor to Deborah, Albert E., and Nathaniel B. Powers,) of Lansingburg, N. Y.

Patent Case.—Heavy Damages.

Franklin Ransom against the Corporation of the City of New York.—This suit, which was brought against the city for an alleged infringement of a patent for a method of working fire engines, so as to enable them to throw a higher column of water, was concluded on the 24th ult.

The patent is described in the specification as an invention for "employing the pressure of a column of falling water, or the tendency of the hydraulic pressure on water at rest, to assist in the working of fire engines by combining a hose or pipe, inducting said water with the receiving tubes of an engine or pump, operated by animal or mechanical power."

The plaintiff claims $20,000 for actual and treble that amount by way of exemplary damages. The defence is that the plaintiff's invention is not a novelty. After an elaborate charge by the Court, the Jury retired to their room, and after an absence of five hours brought in a verdict for the plaintiff, assessing the damages at $20,000. C. M. Keller for plaintiff; James W. Gerard for defendants.

Heating the Feed Water of Steam Engines.

MESSRS. EDITORS—I wish to communicate to you and the public through the columns of your invaluable journal, a discovery I made in heating the feed water of a non-condensing steam engine; it is very simple in its application, and the cost a mere trifle. I made this discovery while running an engine at New Orleans nine years ago. The feed water of this engine was only heated to about milk heat, and I essayed to find out the cause. I stopped up the waste water pipe with a piece of cotton which was near at hand, and to my satisfaction I discovered that the water became instantly, as if by magic, heated to the boiling point. The cause is simply this: a quantity of air rushes up the pipe into the heater at the intervals of the steam escaping, this partially separates the steam from the water, and therefore prevents it from heating. To retain the use of the pipe, I placed the end of it in a tub of water; the water, acting like a valve, prevents any air from getting into the heater, and with this arrangement I have always found the force pump to work better.

J. MCLEWIE.

Cincinnati, Ohio, 1856.

A Search for Readers of Scientific Works.

MESSRS. EDITORS.—My efforts to raise a club for the SCIENTIFIC AMERICAN, at Grand Rapids and its vicinity, this year, has resulted in a *grand* failure. I cannot get my brother farmers to take that interest in scientific subjects which their importance demands. In a new country like this, the necessity of doing this by rule, or scientifically, does not appear in a right light, to the busy people, whose universal answer is, "I take more papers now than I can find time to read." The political news must all be read, for each party is very confident that the prosperity of the nation depends upon its ultimate triumph. Then come newspaper stories, and a long catalogue of "words without knowledge," better calculated to empty the head of any common sense it may possess, than to fill it with useful knowledge. Some plead poverty and hard times; but most of these, I am sorry to say, spend a much larger sum, yearly, for tobacco, which injures their bodies, than what would be required to secure the reading of the SCIENTIFIC AMERICAN to elevate their minds.

My help was taken sick about the time your new volume commenced, and this threw upon me an unusual amount of labor, and prevented me from giving that attention to the SCIENTIFIC AMERICAN, by visiting people in person, so I accordingly made early arrangements with W. S. H. Welton, President of our Kent Co. Agricultural Society, who was doing business at the Rapids, to receive subscriptions, and gave notice that such arrangements were made. But people would not hear a word of any thing but politics till after election. Immediately after, I prepared the notice in a plain hand-writing, with the intention, first, of posting it up in the Grand Rapids P. O., but the editor of the *Eagle* volunteered to insert it in his paper, and I concluded this would be the better way. The result has proved that the only sure way of raising a club is to see them personally. The benediction under the caption of "Pats on the Shoulder," in No. 13, seemed to demand this explanation.

With a full determination to continue to urge the claims of the SCIENTIFIC AMERICAN upon all classes of men as I have opportunity, I remain sincerely yours. J. C. ROGERS.

Wyoming, Mich., Dec. 15, 1856.

[Our correspondent is a lover of useful scientific knowledge, yea more, he is an apostle of science, for he spreads its light among his fellow men, for their benefit, not his own. We have no doubt but all the persons to whom he has especially alluded would be greatly benefitted by becoming readers of the SCIENTIFIC AMERICAN. We say this not for the purpose of impressing them with such an idea to increase our circulation, but because our heart is also interested in the work of spreading useful information.

The Compass on Iron Ships.

MESSRS. EDITORS—I notice in the SCIENTIFIC AMERICAN of the 13th inst. an article with the above title, containing a notice of some experiments by Dr. Scoresby, of England, having for their object the removal of local attraction on the mariner's compass. A compass which accomplished not only this end, but also gave, invariably, the true meridian, was invented by John R. St. John, of Buffalo, N. Y., some years since. It was used to some extent upon the lakes and the ocean, as well as on land; and any man, whether seaman or "land lubber," who understood the four elementary rules of arithmetic, could always ascertain by it the true meridian.

The compass card has upon its face two additional needles, which are reversed by the attraction of the main needle, and by a peculiar method of charging these "satellites" they show the amount of variation of the larger needle, and under all circumstances correctly. What more can Dr. Scoresby do?

Mr. St. John has never urged this matter upon the public, and for this reason it has never come into general use. Any further particulars may be obtained by writing to the inventor. Let us give American certainties preference over foreign theories, and render "honor to whom honor is due."

C. C. HASKINS.

Monroe, Mich., December, 1856.

Terrestrial Magnetism.

The Editor of *Chambers' Edinburgh Journal* states that Major Gen. Sabine, Vice President of the Royal Society, (and whose name stands foremost among philosophers who make terrestrial magnetism a study,) has prepared a large new map representing various magnetic phenomena. Accompanying this map, the history and philosopy of the subject are treated in a lucid style. Halley, more than a hundred years ago, constructed a magnetic map, and anticipated some results that have since been arrived at. He showed that, contrary to the very common opinion, there were "two poles attracting the north end of the needle in the northern hemisphere, and two poles attracting the south end of the needle in the southern hemispere. Two of these (one north and one south.) were stronger than the others, and they were not fixed, but movable, the movement being of that slow progressive nature described by the term 'secular,' in contradistinction to 'periodical.' For want of sufficient data, Halley felt himself baffled in his attempts to explain the phenomena; 'whether these poles move altogether with one motion,' he says, 'or with several—whether equally or unequally—whether circular or libratory; if circular, about what center; if libratory, after what manner, are secrets as yet utterly unknown to mankind.'

By enlightened and persevering research, some light has been thrown on these secrets—an achievement, indeed, of the science of our own day.

The present position of the four magnetic poles have been determined exactly or approximately. Hansteen, Erman, and Due traveled to Siberia, in 1828–9, and found the weaker pole of the northern hemisphere to be 'in or about the meridian of 120° east.' In Halley's time, it was not far from the meridian of the British Islands; and here we see a remarkable instance of secular change. In 1843 and 1844, Lieutenant-colonel Lefroy, then at Toronto, determined the position of the stronger pole; it was in 52° 19′ north latitude, and 268° east longitude—the change in this case having been but small. A similar state of things prevails in the southern hemisphere. The antarctic expeditions of Sir James Clark Ross (1839–43) acquainted us with the fact, that the stronger southern magnetic pole had moved but little from the position assigned by Halley; while the weaker, which he placed 265° east of Greenwich, must now be placed between 30° and 40° to the west. Thus the system in the south is a duplicate of that in the north.

These mysterious movements, as is well known, are the cause of that change in the direction of the magnetic needle, the 'declination,' as it is called, which has been noticed almost from the time the compass was brought into use. The magnet makes a long and slow oscillation from east to west—that is, its northern end points sometimes to the east of north, sometimes to the west, and points exactly north only when it reaches that point in its 'secular' movement. Having attained its westerly maximum, it is now slowly returning to the east. 'We know,' says Major General Sabine, 'from thoroughly trustworthy observations, that the westerly declination at St. Helena has increased during the last two hundred years at a nearly uniform rate of eight minutes in a year; and not only so, but that this annual increase takes place in equal aliquot portions in each of the twelve months.' It does not surprise us to be told that 'we are as yet wholly without a clue to guide us to the discovery of causes at once so general and so systematic;' and we are quite prepared to admit that 'their discovery will undoubtedly rank as one of the greatest discoveries in the progress of natural knowledge.'"

New Inventions.

Improvement in Molding and Shaping Metals.

Iron molding is one of the most universally practiced arts in our country; any improvement, therefore, in any branch of it, is of very general importance, no matter who the inventor may be, nor from whence he hails.

The accompanying figures are illustrations of improvements in molding, for which a patent has been obtained by John Downie, Glasgow, Scotland, and which have been described in the London *Engineer* and Newton's *Magazine*, from which we have obtained our information. The improvement is held to be a valuable one.

This invention relates to a system or mode of molding metals or other materials wherein the pattern has motion given to it during molding, so as to effect the finishing of the surface by mechanical means—leaving nothing to be done by hand on the withdrawal of the pattern from the molds. In cases where the form of the pattern prevents rotation, rectilinear or other motion may be adopted for obtaining the same result; that is to say, for sleeking or finishing the mold and withdrawing the pattern; and in cases where, from the shape of the pattern, the sleeking or finishing cannot be effected by moving the pattern, the rotatory or rectilinear movement may be adopted for merely withdrawing the pattern from the mold.

The invention relates also to the arrangement and manufacture of molding flasks, in such a manner as to form exact counterparts of each other. In carrying this out in practice, the bearing or contact surfaces of the flasks are cast on chill plates, turned in the lathe, planed or otherwise reduced to an accurately regular surface.

In flasks for "pot" and other molding, this invention dispenses with the necessity of using "cheeks" for protecting the partings in the mold. The principle is also applicable to the molding of various materials, such as terra-cotta, encaustic tiles, stucco, and other decorations for buildings, statuary, and ornamental fire-clay work, drainage or sewer tubes in clay or other materials, and, in short, to all classes of molding or shaping metals or other materials where molds are employed.

Fig. 1 is a longitudinal vertical section of a machine for molding three-legged pots, and fig. 2 is a partial transverse vertical section of the same. Fig. 3 is a partial sectional elevation of the core-box, for forming the core for the pot; and fig. 4 is a vertical section of the mold, complete and ready for receiving the molten metal.

The molding apparatus consists of a framing, *a*, fitted with a horizontol plate or table, *d*, upon which the sand to form the mold is rammed in the flask or mold-box, *c*. The pattern lies horizontally in an aperture in the table, which aperture it exactly fills when it is raised to its highest position. This pattern corresponds to the exterior of the pot to be molded, and is formed with a number of rings or collars, *e f g*, extending beyond its rim. The collar *e* is conical, and forms a conical parting surface in the mold to secure the subsequent accurate adjustment together of the core and external portions of the mold. The collars, *f* and *g*, are turned accurately on the faces looking towards each other, to fit a diaphragm, *h*, the lower portion of which is formed upon the framing, *a*, whilst the upper portion is formed upon the framing, *i*, constituting the hood of the apparatus.

The sides of the diaphragm, *h*, are turned or planed to fit the collars *f* and *g*; and the aperture in the diaphragm through which the pattern piece passes, fits the neck, *j*, between the collars, *f g*, laterally but is elongated vertically to allow of the rising and falling of the pattern. The collar, *g*, is in the form of a cam or eccentric, and rests upon a bearing piece, *k*, capable of accurate adjustment, as to hight, by means of a wedge, *l*, below it. On the front of the collar or cam, *g* is keyed a spur wheel, *m*, which is in gear with a pinion, *n*, carried on a spindle which has bearings in the side of the apparatus, and passes out in front to receive a hand wheel, *o*, by means of which rotatory motion is imparted to the pattern piece. It will be obvious that by turning the pattern piece it will rise and fall according as the projecting or the reverse part of the cam, *g*, comes upon the bearing, *k*.

In figs. 1 and 2, the pattern piece is represented with the projecting part of the cam downwards, and the pattern is consequently elevated to its highest position. Patterns or pieces, *p*, are formed or placed upon the plate, *d*, for the handles of the pot and for the pouring gate, and the sand is rammed into the flask, *c*, upon the pattern, the legs being molded in the usual way by means of loose pieces which are subsequently picked out of the mold. The projecting part of the cam, *g*, is made concentric with the axis of the pattern for a short distance; and on the pattern being turned, after the sand is rammed in, it keeps in contact with the surface of the mold for a short time, whilst the turning action

MOLDING AND SHAPING METALS.

Fig. 1

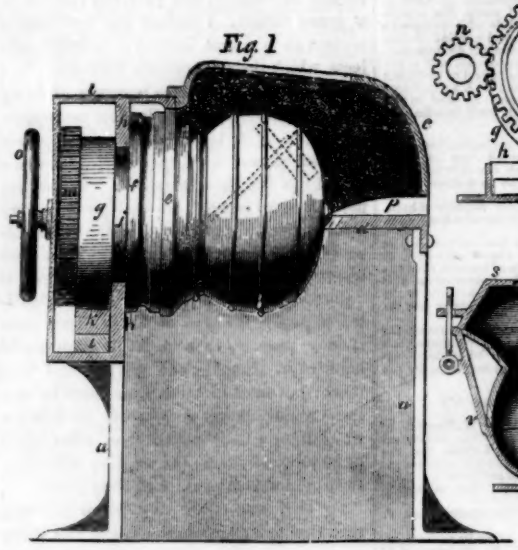


Fig. 2

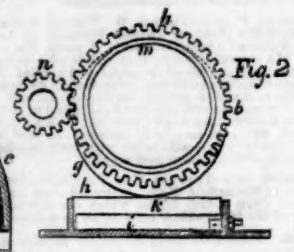
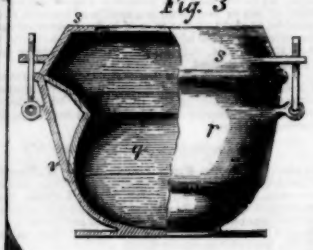


Fig. 3



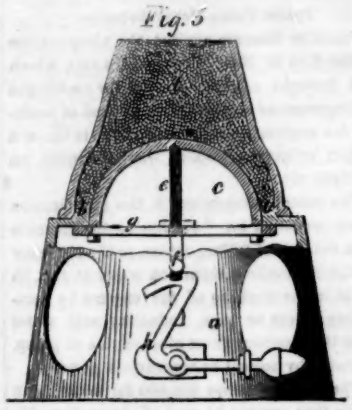
smooths the surface of the mold. On continuing to turn the pattern, the eccentric part of the cam, *g*, comes upon the bearing piece, *k*, and causes the pattern to be lowered from the mold. When the lowest position is reached, the pattern will be quite free from the mold, and the flask or mold box, *c*, with this portion of mold, may be removed, without danger of injuring the sharpness of any part thereof. The core for the pot is formed in the core box, shown in fig. 3. The indented portions of the core are shaped by two semi-circular pieces, *q*, fitted into the box, *r*, and a conical box, *s*, placed on the top, keeps them in position, and serves to form the base and support for the

Fig. 4

core, which remains in it when the entire mold is put together in a complete state, as shown in fig. 4. When the boxes, *r s*, are rammed full of sand, the whole is inverted and the box, *r*, is removed, thus leaving the pieces, *q*, free to be removed laterally. Two half molds, *t*, formed separately by means of the apparatus already described, are placed round and above the core, *u*, (fig. 4,) which completes the mold ready for casting. The outer portions of the mold and the core are made to fit accurately together, not only by the conical surface formed by the shoulder or collar, *e*, (fig. 1,) a surface corresponding to which is formed on the core, but also by means of a check or step, V-formed, at the line of unction of the mold boxes, *c* and *s*.

Fig. 5 is a partial sectional elevation of a modification of the improved molding apparatus, as adapted for molding spherical shot or shell—the apparatus represented being for molding the two halves of the shot or shell. In the arrangement represented, the smoothing action is dispensed with, and a simple rectilinear motion is given to the pattern, to withdraw it from the mold. The apparatus consists of a conical casing, *a*, formed with a horizontal plate, *b*, which, in this instance, takes the shape of a circular rim, with a central circular aperture for the pattern, *c*. The rim, *b*, is turned perfectly true and square to the vertical axis of the pattern, to form the parting surface in each flask, *d*. The junction edges of these flasks are turned to fit each other accurately—one being made to overlap the other, to insure the concentric adjustment together of the two flasks, whilst the plate, *b*, of each molding apparatus is shaped to fit the particular flask for which it is constructed. The pattern, *c*, is supported upon a vertical spindle, *e*, jointed to a lever, *f*, below, the han-

Fig. 5



dle of which lever projects through a slot in the side of the casing, *a*, whilst the lever turns on a center or fulcrum at the opposite side. Two bars, *g*, placed across each other, are attached to the under side of the pattern and are shaped with an edge directed upwards. These edges determine the hight to which the pattern is lifted through the plate, *b*, by coming in contact with the under side of that plate, and are capable of accurate fitting, which is necessary to insure the true spherical shape of the shot or shell. When the molder proceeds to ram up a flask, he lifts the pattern into place by means of the handle, *f*,—a weighted catch lever, *h*, coming under this lever and holding it in position. When the flask is rammed up, the lever, *f*, is released by shifting the catch, *h*, and the pattern is immediately lowered from the mold, and the half mold may then be removed from the apparatus without danger of injuring the sharpness of its parting edges. A rotatory movement may be given to the pattern if desired either by attaching a lever to its under side to turn it on its vertical axis, or a rim of teeth may be fixed upon it below the plate, *b*,—a pinion in gear with these teeth serving to impart the motion

(*Continued on eighth page.*)

Increasing the Density of Colors.

The colors of velvet—either that of silk or cotton—appear more intense, or "richer" as it is generally termed, than those of any other known fabrics. The cause of this is the greater density of the colored fibers of which the fabric is composed. Flowers are coated with a fine velvety surface, and this imparts to them that superior tone of color, which "Solomon in all his glory" of rich vesture, was unable to rival. Any invention to increase the density of textile fabrics, adds greatly to their beauty. A few years since, T. Mercer, of Manchester, Eng., secured a patent for accomplishing this object in cotton and linen cloth, by steeping such fabrics, in a strong solution of the carbonate of soda. It was stated that Turkey-red colored cloth was greatly improved by this process; and also all other colored fabrics capable of withstanding the action of this alkaline solution. We perceive, by our excellent cotemporary, the London *Engineer*, that another patent has been secured in England for the same purpose, but using a different condensing chemical. The patentee is John McLean, of Glasgow; the condensing substance which he employs is a salt of barium, or calcium (lime) or strontium. Cotton or flax in any stage of its manufacture—from the raw to the finished state—if steeped for a short period in a solution of any of the above-named salts, and afterwards dried, will be increased in density, and its commercial value thereby increased.

The salt of strontium will be too expensive to use for this purpose, unless its effects are superior to those of the other salts named An increase in the density of any fabric, not only renders its color more intense; but the fabric itself becomes *finer* in proportion as it is condensed, and thereby the very quality of the cloth is as much improved as its color.

Patent Extension.

Joel W. Andrews, of Bridgeport, Pa., has applied for an extension of the patent granted to him March 21, 1843, for an improvement in burning bricks. The petition is to be heard on the 9th of March, at the Patent Office. Persons wishing information in regard to the rules necessary to be observed in opposing this extension must apply to the Patent Office for them.

This invention relates to an improved method of constructing kilns, the walls of which are similar to those now in use; and under the floor of this kiln are flues leading into air chambers, or ash pits, under the grate bars, upon which the fuel is to be placed. The air necessary to combustion is forced into these flues by a fan wheel, or other blowing apparatus.

The claim is for the particular arrangement and combination of the flues, dampers, and fire compartments therein, there being a double flue along the center, from which lateral flues branch off in a curved or angular manner, so as to admit of the employment of dampers in each, in the manner made known.

The Scientific American has boldly denounced the action of the Secretary of the Interior in his attempts to misappropriate the new addition to the Patent Office to other than its legitimate purposes. For our interference to preserve this noble institution to its legitimate uses, we have been deprived of the privilege of receiving notice of applications for the extension of patents, therefore they are only to be found in political journals read by comparatively few inventors and patentees.

New Improvement Wanted for Saw Mills.

A correspondent writing from the interior of this State informs us that a self-feeding apparatus for the steam saw mill is much wanted. The fuel used is saw dust, and the labor of firing it is very severe. He is practically engaged in erecting such mills, and thinks such an apparatus, if it were effective and simple, would make a fortune to the inventor.

Three hundred tuns of tobacco were raised during the past season in the Chemung valley, N. Y. Tobacco is now extensively cultivated in this State.

Scientific American.

NEW YORK, JANUARY 3, 1857.

Important from Washington.—Another New Patent Bill before Congress.

Private advices from Washington bring to our knowledge the fact that another new Patent Bill has been drawn up, and will shortly be reported to Congress.

We are gratified to be able to say, that so far as we have heard, the New Bill is one of a very moderate character, and based upon the ground long contended for by the SCIENTIFIC AMERICAN, viz., that the present Patent System, as shown by its fruits, is, when properly administered, as nearly perfect as any system can be, and that no radical change is demanded.

The principal alterations which we have advocated are of a minor character, such as the provision of additional facilities for carrying out the present laws, the expurgation of the retaliatory clause against British subjects, the reduction of the caveat fee, etc. Even in these smaller particulars we have ever advised the utmost caution; and we still believe that whatever corrections are made should be introduced very gradually, and few at a time. Let us beware how we tamper with or experiment on a system which already works well, and gives general satisfaction. We must not forget the old adage, "Let well enough alone."

The principal features of the New Bill to which we have alluded, are, if we are correctly informed, as follows:—

1st. The salary of the Commissioner is raised to the same as that of the Superintendent of the Coast Survey, viz., $6,000 per annum.

[This is a good provision. The present salary of the Commissioner is only $3000, which is not enough for the services of a man of high ability and eminence, such as this responsible and difficult post should command.]

2nd. Appoints a Board of Appeal, consisting of three Chief Examiners, with a salary each of $3,500 per annum. It is to be their duty to entertain all appeals from the decisions of the examiners, in cases where inventors think that injustice has been done them in the rejection of their applications. No fee for such appeals. From the decisions of this Board further appeal may be taken to the Commissioner on the payment of a small fee.

[This feature will give satisfaction *provided* the proper individuals are placed upon the Board. Some of the oldest and most experienced among the examining officers, and who would, perhaps, expect, on the ground of experience and seniority, to be appointed, are, to their discredit, the most illiberal in their feelings towards inventors and in their interpretation of the Patent Laws of any persons in the department. None of your conceited, crabbed, mulish, illiberal-minded individuals—men who never see anything new—who are always prone to regard one device as but the mechanical equivalent for another—with whom the "double use" of a thing is a continual stumbling-block—such men should never be put upon the proposed Board. We want fresh, liberal, energetic persons, who will interpret the Patent Laws in their most liberal sense.

Some such Board as the above is needed, for the present duties which devolve upon the Commissioner are greater than any one man can or ought to be required to perform. The proposed Board would relieve him very much, and, if properly constituted, be of great advantage to inventors.]

3d. Reduces the caveat fee to $10, no part thereof to apply towards the patent.

4th. All return fees prohibited.

At present, $20 of the government fee is refunded if the applicant is rejected, and chooses to withdraw his case. Over $100,000 in uncalled-for return fees has remained idle in the Treasury for many years. Besides, the expenses of examination have augmented, and the revenues of the Patent Office require to be increased accordingly. The mode of promoting this increase, as above, will give far better satisfaction than a direct rise of the government tax.]

5th. If an inventor has more than one claim in his specification, an extra fee is to be paid for each additional claim.

[We object to this, because an inventor should know, beforehand, exactly what the cost of his patent is to be. Besides, he ought not to be *mulcted* in his endeavor to secure proper protection for his invention. The present practice of the Office, in requiring the inventor to take out a separate patent for each distinct subject of invention is sufficiently severe, without the imposition of any new burden.]

6th. Publication of the specification and drawings of each patent in full, at the government expense.

[We regard this as an uncalled-for measure. The Patent Office building contains the models, drawings, and recorded specifications of every invention, patented or rejected, and is freely open to public inspection. Duplicate models are furnished, and also duplicate copies of drawings and specifications, at a slight cost, to those who want them.

The Annual Reports of the Commissioner also furnish a brief, intelligent, and interesting synopsis of all inventions, convenient in form, and within the reach of inventors and all that portion of the public who take an interest in patent matters. This is sufficient for all practical purposes. The full drawings and specifications of five or six thousand patents a year would require a number of unwieldy, costly volumes, wholly beyond the reach of the public.

We are in favor of the extension and circulation of new ideas and new discoveries to the furthest possible extent; but we see nothing but a limited and excessively expensive enterprise in the proposed publication. We fear it would be a dead, unwieldy weight upon the Patent Office, complicating and retarding its business. The more open, free, prompt, active, and simple the department can be kept, the better. The annexation of a huge printing office to its already manifold details would be anything but desirable; and the expenditure of half a million or a million of dollars per annum to keep up such an establishment would be next to a waste of the public revenues.]

The foregoing, we are assured, are the essential features of the New Bill shortly to be presented to Congress. We have not seen it, and therefore cannot speak positively on the subject. It may be that it contains, in addition, some disguised plot of reckless patent speculators. If it does, we shall most assuredly labor for its defeat with all our might and main, with a success, we shall hope, equal to that which attended our efforts in defeating the Woodworth Planing Machine schemers.

But if the Bill proves to be a genuine one, of the moderate character above indicated, it will receive our support except as to the objectionable clauses pointed out, or others which we may yet discover. We shall publish the Bill in full as soon as a copy can be obtained.

The Woodworth Ogre Again.—Lobbyists.

Under date of Dec. 20th, the Washington correspondent of the *New York Herald* states that the lobbyists "are now industriously arranging their plans for a general assault after the holidays. Patent cases are considered the best paying ones before Congress, and 'Woodworth's Patent' is a favorite scheme. The owners had at one time determined to abandon their fruitless efforts for an extension, but they were again brought to the scratch by the lobby, and 'the fight goes bravely on.' Protests against it are pouring in from all parts of the country, and in spite of the handsomely gotten-up pamphlets, the case will be thrown sky high."

As we announced in our last number, the Woodworth Patent has expired, and the invention is now public property. Nevertheless it will not do even now to slacken vigilant opposition to its extension. Those interested in this patent will hold on to their scheme like the iron grasp of Death, and will not be driven off by anything short of a regular Malakoff bombardment. They can afford to fight on just so long as there is the faintest ray of hope for success, as a profitable monopoly is a desperate thing to kill off. We have no doubt whatever that they will continue to besiege Congress with their memorials just so long as one solitary Member can be induced to listen to their appeals. The *N. Y. Herald* has been an able and efficient opponent of this extension from the beginning, and its opposition has been of great service to the cause of truth and justice.

The lobby—the lobby—the potent lobby! What does this mean? A very respectable mechanic called at our office a few days since, and informed us that he was closing up his outstanding affairs, and was going to give up his shop, for the purpose of attending at the Legislature this winter as a lobby agent. We looked upon him as a fallen man—a fit subject of pity—and we have not much doubt of his final moral ruin.

Why; a lobby agent is one of the most degraded characters that we can now call to mind. He is an enemy to all honest legislation. The liberties, the rights, and the sacred franchises of the people, are all for sale in his hands. He will engage in any scheme to plunder the Treasury for pay. He has no moral honesty, no conscience, in short, he appears to be destitute of everything which adorns the character of human nature, and Congress, by permitting itself to be influenced by these known enemies of all law—but the law of self-becomes a party to the gross villainies which are constantly practiced at every session, upon the rights of the people, whose interests they are called upon to respect and guard. We believe there are honest men in Congress, and it is their duty, loudly and earnestly, to endeavor to remove this festering curse from the "Halls of Congress," in order that the people may know what to depend upon. They are in constant fear that some private scheme will be "lobbied through," which will work ruin and disaster to all their cherished hopes and interests. And they have reason to fear, since they have no means of knowing what schemes are about to be "put through."

Congress wastes, annually, thousands of dollars in the publication of muddy and cumberous reports, to tell the people what they have been doing, but they keep them in a state of blissful ignorance of what they are intending to do. The various correspondence from this modern Pergamos, which garnishes the columns of the newspapers, is about all that is known as to the various schemes under way to boost some little favored clique upon the broad shoulders of a patient and much-abused constituency—but they do not dive down into the depths of the mischief. It is only a play about the surface, consequently there are no big waves to roll back to the shores where the people dwell. We were startled by a statement made in our hearing, the other day, that an ex-Chairman on the Committee on Printing and Engraving, in the House of Representatives, who entered Congress as poor as a "March hare," cleared the snug sum of $200,000. He remained only one session, and then retired by the consent of the voters in his District. What a pity! What a loss to the public have been the patriotic services of this Hon. Member since his retirement to private life!

Let us urge this matter upon the serious consideration of our readers. What confidence can be placed in committees who are thus open to the approach of outside influence, by those who act only from motives of the purest selfishness, and who have ample means to carry on their schemes? We say, not the slightest; and it is upon this ground that the Woodworth Patent is expected to be extended.

If the Committee having this matter in charge will but do their duty,—the honest, the upright Members of Congress will not be asked to listen to a long-winded report in favor of the prayer of the memorialists. It is a scheme not worthy to be obtruded upon the patience of the House, and we therefore demand, in the name of the public, that it be killed in committee, and the schemers notified to settle their hotel bills and pack up their trunks and be off.

We regret to be obliged to inform our subscribers that owing to the unexpected demand for back numbers, we are no longer able to supply the following in this volume:—1, 2, 6, 10, 11, 12, 13, 14 and 15.

Food—Philosophy—Bread.

There is no kind of vegetable food more palatable, healthy, and nutritious than good bread made of fermented wheat flour. And although it is not the most common bread used in every country, yet we believe it is the most highly esteemed by all. Where, or by whom leavened bread was first discovered, is unknown. The earliest history informs us that the most ancient matrons of Israel were acquainted with it, but the name of the good housewife who made the first fermented wheaten loaf has not been handed down in the olden chronicles. If her name were known, she certainly would deserve the first toast at all public dinners (and private ones too.) but since this is unknown, we conjecture the discovery was made by accident; undoubtedly it never resulted from reasoning *a priori*, as no one, naturally, would suppose, that the fermentation of flour was anything but a rotting process, rendering it not only useless, but positively injurious for human food in any form.

A certain quantity of flour is put into a vessel and mixed with a certain quantity of milk-warm water and a little yeast, then kneaded to proper consistency, exposed to a heat of about 65° Fah. for a few hours, when it *rises*, as it is termed, and is afterward kneaded again with some fresh flour, then put into an oven and baked; it is then taken out in the form of loaves, called "baked wheaten bread." This is about all that is known, generally, of the philosophy of bread-making.

Chemists differ in opinion regarding the primary cause of fermentation; but it is known that leaven induces this action in dough, and that alcohol and carbonic acid are formed thereby, the flour being decomposed and passing off in the form of these substances. This is the reason why some have decried the use of leavened bread, because, they said, it was formed by wasting "some of the nutriment of the flour." But as none of the nutricious part of the flour is driven off in fermentation, only carbon and hydrogen—respiratory substances—being dispersed, their loss is compensated by the improved healthful quality and pleasant taste of such bread.

Raised bread made of effervescing salts, such as saleratus, is not so palatable, so healthy, nor will it keep so long, as bread raised by fermentation. The public has oftentimes been cajoled by persons pretending to make bread which contained all the aliment of the flour that passes off as spirit in fermented bread. A moment's reflection will convince any person that, weight for weight, fermented bread must contain the greatest amount of nutriment, because unfermented bread contains a greater amount of respiratory substances—and as a consequence, less of the nutricious.

One part of the philosophy of bread-making—and it is to this feature we wish more particularly to invite general attention—is the maintaining of the heat constantly above the boiling point of water. The starch of flour is insoluble in water at a temperature below 212°; it has to be well boiled before it becomes soluble, but when moistened with water and exposed for a short time in an oven to a heat of about 300° Fah. (never below 212° at least,) its nature is changed; it becomes dextrine, which is soluble in cold water. The heat of every loaf of bread placed in an oven must be exposed to 212° Fah. at least, or it will not be properly baked, and cannot be so easily digested,—heavy, imperfectly baked bread is therefore not only unpalatable, but also unhealthy.

The bakers of Paris have a world-wide celebrity for making beautiful fermented bread. Their skill and science are mostly displayed in managing the temperature of their ovens; they employ thermometers to indicate their heat, and watch them with unceasing attention; their baking heat is maintained from 212° to 400° Fah.

Award of Prizes.

The Prize List will be published next week. This number of the paper went to press before the 1st of January, therefore we could not properly complete the list at that time.

One hundred large ships averaging 1,000 tuns burden, were built in Maine, in 1856.

Finale of the Woodworth Patent.

WASHINGTON, Dec. 26, 1856.

EDITORS SCIENTIFIC AMERICAN:—

This day celebrates the termination of that Great and Oppressive Monopoly, the Woodworth Patent.

All honor to the SCIENTIFIC AMERICAN for its long continued and vigorous opposition to the gigantic monster. Your efforts, and yours almost alone, have ensured its utter downfall. You have scattered broadcast throughout the country a knowledge of its baneful influences. You have shown to the people how destructive were its workings upon the industrial interests of the land. You have exposed to the light of the noonday sun the corrupt and villainous schemes by which avaricious speculators have sought to extend the grant.

Your labors have been crowned with entire success! The Woodworth Patent is NO MORE! Again I say ALL honor to the SCIENTIFIC AMERICAN!

This being the day on which the great Woodworth Patent expires, I was led by motives of curiosity to visit the House of Representatives. I thought, perhaps, the schemers would bring up their bill for the extension, and by some underhanded move, try to shove it through. But no such attempt was made, for, luckily, it was *Objection Day*. That is the day when private bills may be taken up, but if a single member *objects* to any bill, its consideration is at once es-stopped. The Woodworth schemers know well enough that there were a hundred members ready to jump upon their feet and object the moment they should offer their bill; and, therefore, they were wise enough not to prejudice any future chances by kicking directly against the pricks.

The ugly monster therefore died an easy, quiet death, without even a groan or a spasm in his latest moments.

The schemers are on hand, however, and are still determined to compass their end, if money and wire pulling can serve them. But their efforts are insane. Now that the patent has expired the prejudice against them is greater than ever.

While mechanics thus rejoice over the defeat and death of one of the greatest and most burdensome schemes for plundering the working people of this country, they must not forget to render due honor to the memory of WILLIAM WOODWORTH, the originator, for all practical purposes, of machinery for planing lumber. He has conferred upon this country, by his inventions, great and lasting benefits. And, now that these inventions are stripped from the hands of heartless speculators, and freely subject to the public use, those benefits will begin to be fully felt. Every village and hamlet will soon re-echo to the buzz of busy mechanism set in motion by the genius of WILLIAM WOODWORTH.

The heirs of this great inventor should not be forgtten. Although they have three times received into their hands the imperial legacy of Woodworth's Patent—once by the original grant and twice by extension for their benefit—and although they have on each occasion foolishly thrown away their magnificent inheritance—given it to speculators to fatten upon and oppress others—still, for the sake of and in respect to the memory of their noble predecessor, they should not be forgotten in their extremity.

The heirs of William Woodworth allege in their petition to Congress that they are poor, acknowledging, as the reason, that they foolishly gave away the patent which Congress so liberally extended for their benefit.

While it would be the hight of injustice for the National Legislature to longer perpetuate the great burden upon industry which the Woodworth Patent has of late years proved, still it would be but proper generosity to bestow upon Woodworth's heirs some new and substantial token of the country's appreciation of the benefits it has received from his genius.

The SCIENTIFIC AMERICAN, I am sure, will delight to aid in such a project, and so will every lover of science and general improvement. Let us petition Congress to present to Woodworth's heirs a New Year's gift of *One Hundred Thousand Dollars*. B.

[We cannot concur with the sentiments expressed in the latter part of our correspondent's letter. William Woodworth, if living, might be entitled to the appropriation suggested by our correspondent, but where are the heirs of any other deceased inventor who have received the amounts that the Woodworth heirs have from time to time obtained? One hundred thousand dollars is no small sum, and as our correspondent admits it was only from their own folly that they sold so cheap; in other words, they made a foolish bargain, and if Congress is to appropriate large sums of money to relieve all of us who have in our lives made the same mistake, it will not take long to drain the public treasury of its last dollar. Reasons could be multiplied to show why such a scheme would be establishing an unwise precedent had we space to discuss the subject; but we had rather have this appropriation made, and money to the amount of millions of dollars paid out of the Treasury than to have the monopoly continued by a renewed extension of the Patent.

Our reasons for this have been so often expressed in our columns that it is needless to add them here. In a pecuniary point we have no interest; what influence we may have brought to bear in exterminating this monopoly has been from a desire to serve the public weal, which has been done even at the expense of making some former friends our personal enemies.—ED]

Liquid Stone.

MESSRS. EDITORS—I find in No. 15 of your valuable paper a mistake in the article headed "Liquid Stone." My mode of dissolving quartz in water is as follows, viz.:—

There is a calcining kiln, holding about twenty tuns of quartz, with the fire only in each side, at the front. The floor, grate and trap-bridge, are upon a *declivity* at an angle of about 30° to facilitate its *tumbling* into the cold tank, fed by a pipe leading the cold water down near the bottom, while the warm water is conducted off at the surface. The quartz, thus rendered friable and somewhat porous, is *tumbled* again into a scoop platform of like descent into the "Pestle-Mill" of circular construction, embracing all the facilities of crushing and sifting in a very rapid manner, with less than a four horse power, to turn the shaft, which raises a dozen iron pestles (with case-hardened steel facing), each pestle having a small pulley for a succession of inclined planes in a steel rim to traverse upon. The shaft carries also around with it a shoveler, in form somewhat similar to a plowshare, close to the stamping-floor the latter being of solid timber, covered with a succession of iron bars bent in and against each other. The shaft also carries a metallic sieve with its knocker. From this mill the pulverized quartz finds its way, by a continuous descent, into the great boiler, being first saturated on its passage thence with a small quantity of the cheapest solvents rendered caustic by lime.

A tun of quartz thus prepared at a time is conducted into the boiler, together with several barrels of water, and water only.

Thus, by the powerful chemical action, and the happy result of an advantage taken by highly heated steam upon the susceptible quartz, in addition to the latent heat, (and the dry heat under the boiler.) as well as humid heat; the quartz being first rendered porous and saturated with an incredibly small quantity of the cheapest solvent salts, and other agents, a perfect solution of *one tun of quartz, in three hundred gallons of water, is perfected in one hour.*

The solvent used is *common salt*—the chlorine being first set free in my factory for other purposes—used in treating gold-bearing pyrites, &c. The principle, in this particular patent, is the introduction of highly-heated steam through a hollow shaft to the bottom of the digester, while the escape steam, *above a certain pressure*, is rapidly condensed. A 15-horse power engine carries the shaft to five digesters or boilers, beside the *Pestle Mill.*

Thus 25 tuns of quartz are dissolved in a day, making 7,500 gallons of Liquid Stone daily—besides taking out all the gold.

BENJAMIN HARDINGE.

Improvement in Constructing and Working of Locomotives.

A paper has recently been read by D. K. Clark, C. E, before the Institution of Engineers, in London, on the subject of locomotives and the reduction of their working expenses. The paper has been published by the London *Engineer*, in two parts.

The first part contains considerable that is very useful relating to the combustion of fuel, also experiments with Beattie's smoke-consuming locomotive, and the useful effect of heating the boiler feed water. The substance of the experiments with Beattie's locomotive has already appeared in our columns; we will, therefore, pass this part of the paper over briefly, and will give a more full, but still a condensed summary of all the other points discussed by him.

The Boiler.—There are three important questions affecting the boiler open for discussion, with respect to fuel, to water, and to the area of fire-grate and heating surface.

First, as to fuel.—The fuels in use in England are coke and coal. The best coke consists almost entirely of carbon, containing about 98 per cent. of this combustible. The heating power of carbon, when perfectly burnt, is equal to the evaporation of 12 lbs. of water at 60°, into steam of 120 lbs. pressure, by 1 lb. of carbon. In a paper read by the author before the institution in 1853, it was shown by a mechanical analysis, that the combustion of coke in the fire-box of the ordinary locomotive was practically complete, and that, therefore, nothing could be gained by the use of expedients intended to improve the combustion of coke. It is satisfactory to add that, subsequently to the reading of that paper, these conclusions were corroborated by the results of a chemical analysis of the products of the combustion of coke in the engines of the Paris and Lyons Railway, by M. Ebelmen; he found, that under ordinary circumstances, the gases in the smoke-box consisted almost entirely of carbonic acid and nitrogen with a mere trace of of carbonic oxyd, rarely exceeding 2 per cent.

Coal is a compound fuel, consisting chiefly of carbon and hydrogen. The production of smoke in the use of coal—or the suspension of unconsumed particles of carbon—is due to the presence of the hydrogen, because hydrogen has a greater chemical affinity for oxygen than carbon has, and, therefore, having a prior claim to the oxygen for combustion, it impedes the combustion of the carbon. This preference claim must be met, and smoke is likely to be generated, so long as any hydrogen remains to be driven off; when this gas is entirely expelled, the fuel remaining is incandescent coke or carbon, which lies comparatively flameless and smokeless on the grate. In explanation, it must be added that smoke owes its existence chiefly to the fact of the particles of carbon being, in the first place, distilled in chemical union with the hydrogen, in various proportions; and then, in the second place, precipitated as smoke when the hydrogen drops the carbon and seizes the oxygen supplied by the atmosphere. The first condition of the perfect combustion of coal is, therefore, that there should be a sufficient quantity of oxygen to supply the prior requirements of the hydrogen of the coal, and to take up the whole of the carbon precipitated by the hydrogen.

There is a second and equally important condition, that the temperature should be elevated sufficiently to effect the union of the carbon and oxygen. Either a deficiency of oxygen or a deficiency of temperature, suffices for the production of smoke. If the hydrogen could be entirely driven off and consumed before the carbon is separated, smoke would not be produced.

Such are, very generally, the conditions under which coal is consumed; and it will be found that all the successful expedients for the consumption or prevention of smoke under stationary boilers, or elsewhere, involve the observance of the two conditions—an ample supply of oxygen and a sufficiently high temperature.

These points are very clearly stated. It, therefore, is evident that coal (bituminous not anthracite is the fuel under consideration) requires a different method of treatment from coke. The experiments with Beattie's locomotive are detailed to prove that with a proper combustion chamber all the smoke of bituminous coal can be consumed, and that the evaporative power of the coke is inferior to coal. By heating the feed water of the boiler a gain of 12 per cent. was obtained. The American boiler of Mr. Boardman, we believe, is as effective in consuming smoke as Beattie's, while it is more simple in its arrangements In reference to the use of coal and coke as fuel, Mr. Clark says:—

"It may be inferred that the economical evaporative power of the *Canute* (name of the engine) is about 2 1-2 times as great with good coal as it is with good coke; and that, though detailed and continuous experiments are wanting to complete the investigation of coal-burning *versus* coke-burning engines, the conditions most favorable for the two classes of boiler are radically different. The coal-burner appears to require a large grate, and a large atmosphere in the fire-box; whereas it has been found by the author, after extended inquiry, that a coke-burner requires a moderate grate and a moderate atmosphere."

The effect of different kinds of water.—The quality of the water supplied to locomotive boilers has much to do with their efficiency. The water is seldom pure; it commonly holds in suspension mineral, vegetable, or animal matters, which are precipitated and deposited upon the heating surfaces of the boiler, impairing its evaporative power and economy, and destroying the material; or, if muddy in character, causing priming of water with the steam, which is equally prejudicial to the durability of the working parts, and to the efficiency of the engine.

In Ireland the contrasts afforded by the use of hard water from calcareous soils, and soft water from boggy soils, are instructive; the hard water has been known to terminate the useful existence of the fire-box and tubes of boilers within three years, while the boilers fed with bog water have lasted in good order eight or nine years.

The injury inflicted upon those parts of the machinery working amongst the steam raised from bad water, such as the valves, pistons, and glands is also considerable, for grit and mud are carried over in suspension, and accelerate the wear of such parts.

The direct loss of heat by priming, also, is considerable. Fresh water will prime over to the extent of 30 per cent. of the total water consumed. Without at present taking account of the loss by back pressure of exhaust on the piston caused by priming, the loss of heat by priming as above, is 9 to 10 per cent. of the whole heat thrown into the boiler.

Upon the whole, the author is of opinion that at least 10 per cent. of the working charges affected by the quality of the feed water, due to bad water, may be economized by the use of good water."

This leads to the question of a uniformly good water-supply to locomotive boilers. The answer seems simple and obvious; purify the water before its admission into the system, by filtering beds in the case of mechanical impurities, or, for chemical impurities, by the application of chemical antidotes, on a large scale, in the tanks or reservoirs holding the water in store. The author suggested this course in 1853, and he believes it has recently been brought into practice with beneficial results. For the removal of chemical impurities there is no universal medicine; every quality of water must be analyzed and prescribed for individually.

Preserving Timber.

F. G. Ruffin, Esq, editor of the *Southern Planter*, informs us that he knows of some timber that was soaked in corrosive sublimate, which is now perfectly sound after it has been eight years under ground, while the same kind of timber not so treated, was perfectly honey-combed in four years.

This is useful information, as it is satisfactory testimony of the value of Burnetizing and Payenizing timber.

A severe test of the strength of the suspention bridge at Niagara Falls was afforded by the gale on the evening of the 13th ult., when the toll gatherers deserted their posts at either end, and crowds assembled to see it fall, but it stood like a rock.

C. C. of Mich.—We have occasionally a correspondent who seems to imagine that he has a right, simply because he happens to be a subscriber to our paper, to require almost any human service at our hand. Within a few days we have been been requested to investigate into the solvency and future prosperity of some Western railroad, and write out our opinion in regard to it. Another asks us to ascertain how much certain bonds will bring in Wall street. Another politely invites us to hunt up some one of his lost relatives, who left home under suspicious circumstances. Another asks us for the highest market price of apple sauce, or old rags, or how much good fat geese are worth in this quarter. Now we desire it to be understood, that while we are glad to oblige our friends it is manifestly out of our power to leave our business on such expeditions. Subscribers who take the paper, are expected to consider it a full equivalent for the money paid This is a fair business transaction. Inventors and others who desire information in regard to scientific and mechanical subjects—are perfectly free to make their applications to us, but we must decline the honor of ransacking the city and surrounding country for the benefit of any of our subscribers upon matters entirely foreign to our business. Upon reflection you will see the reasonableness of our position—and of the necessity of declining your proposals.

G. W. H. of Ct.—The only way for you to procure a copy of the Patent Office Reports for 1855, will be by application to the Member of Congress for your district.

G. H. Peabody, of Columbus, Geo., wishes to procure a machine for grinding beans, and also a machine for making brooms.

N. A. Wright, of Clinton, La., wishes to correspond with some person who can furnish him with the most approved mill for cutting the potatoe in its preparation for distillation.

W. C. G. of Detroit, Mich.—W. A. B.'s subscription expires No. 52. Vol 11, and J. W.'s No. 22, same volume.

L. H. A. of Ala.—We think your method of obtaining ice for packing is patentable; but we do not think you can freeze water in ice houses in the manner you propose. Injecting alum and preservative solutions into the aorta of animals, is not new, but your application is, and the purpose for which you perform the operations is different from any to which the process has been applied Kerosine oil burns beautifully in lamps manufactured for its special use. We do not like its odor.

E. P. of N. Y.—A hydrometer is not a rain gauge; it is an instrument for testing the gravity of liquids. You will find illustrations of rain gauges in every work on pneumatics; you can make one yourself. Just get a common cube-formed wooden box, well varnished inside and out and place it on a flat plot of ground. Measure its contents morning and evening.

B. J., of La.—The production of ice, artificially, in a warm climate, is simply a question of cost You do not want a person of great scientific reputation to superintend the business. We really hope it can be manufactured for $5 per tun in Louisiana, but we doubt it.

P. J. W. of Ill.—Your disease—bleeding of the lungs—is dangerous, prostrating, and perhaps incurable. A mild climate is the most favorable for you to reside in. Immediate relief was always experienced by a friend of ours, who was subject to attacks of it, by drinking about half an ounce of epsom salts dissolved in cold water,—this was his remedial agent, but it no doubt injures the system.

D. F. W. of Tenn.—There will be some waste of steam from condensation in conducting it through a pipe underground, a distance of 300 feet, as you propose, but if the pipe be well protected, we should have no hesitation in adopting the plan. Let the pipe be laid a little inclined, so as to run off any steam that may become condensed. Be sure and surround the pipe with plenty of good non conducting material, and allow a little free space between the non-conducting media and the outer brick encasement.

A. D. of N. C.—It is nothing new to place a daguerreotype or ambrotype of deceased persons in their tombstones. This custom has been practiced to a considerable extent in this section. We have now in our office a model of this device.

F. G. Ruffin, Editor of the "Southern Planter," Richmond, Va., wishes to correspond with some one who has a good ditching machine. He wishes to know its cost, mode of construction, capacity, and what amount of power is necessary to work it. This class of machines has of late received no attention. A good machine for the purpose is much needed.

D. E. W. of ——.—We cannot give you the information requested in relation to a work on the polishing of steel trinkets.

J. F. of Texas—There is no such instrument as a "mineral rod," to attract gold and silver.

Jas. Campbell, of Middletown, Pa., wishes to know who is the patentee, or who holds the right to the patent on the cone or gimlet point screw, and where the right can be obtained.

A. S. of N. Y.—We do not know the particular address of Mr. H. His P. O. address is in this city. We think his discovery not the same as the one to which you refer.

D K. of N. Y.—By reference to No. 14 of this volume you will find an engraving of the sewing machine to which you have reference.

Money received at the SCIENTIFIC AMERICAN Office on account of Patent Office business for the week ending Saturday, Dec. 27, 1856:—

J. F. M. of Pa., $2); T. J. M. of N. Y., $30); J. P. C. of Tenn., $ 5; J. P. of N. Y., $35; W. J. of Tenn., $3); C. W. A. of Mass., $3); C. B. of N. Y., $55; P. S. of Conn., $25; T. L. of Pa., $25; W. S. of Ga., $25; A. C. of Mass., $30; R. & R. of Pa., $27; K. & L. of Mich., $25; S. H. W. of O., $25; J. F. B., of Pa, $5; J. M. P. of Me., $30; J. M. of O., $30; S. S. C. of N. H., $3); E. H. of N. Y., $35; C. T. B. of Mich., $30; H. T. of Ind., $30; B. T. B. of N. Y., $55 F. G. of N. Y., $55; A. H. of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Dec. 27:—

J. F. M. of Pa.; J. P. C. of Tenn.; H. H. S. of N. Y.; A. P. G. of Mo.; S. H. W. of O.; R. & R. of Pa.; A. H. of N. Y.; T. L. of Pa.; J. F. B., of Pa.; H. H. of N. Y.

Important Items.

GIVE INTELLIGIBLE DIRECTIONS—We often receive letters with money enclosed, requesting the paper sent for the amount of the enclosure but no name of State given, and often with the name of the post office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the post office at which they wish to receive their paper, and the State in which the post office is located.

FOREIGN SUBSCRIBERS—Our Canada and Nova Scotia patrons are solicited to compete with our citizens for the valuable prizes offered on the next volume. [It is important that all who reside out of the States should remember to send 25 cents additional to the published rates for each yearly subscriber—that amount we are obliged to pre-pay on postage.]

COMPLETE SETS OF VOLUME XII EXHAUSTED.—We regret that we are no longer able to furnish complete sets of the present volume. All the back numbers except 1, 2, 6, 9, 10, 11, and 13, we can yet furnish, if new subscribers desire to commence back to the beginning of the volume; but unless they specially request to the contrary when making their remittance we shall commence their subscription from date of receipt of the order.

INVENTORS SENDING MODELS to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies, either through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them.

PATENT LAWS AND GUIDE TO INVENTORS.—This pamphlet contains not only the laws but all information touching the rules and regulations of the Patent Office Price 12 1-2 cents per copy. A Circular, giving instructions to inventors in regard to the size and proper construction of their models with other useful information to an applicant for a patent, is furnished gratis at this office upon application by mail.

RECEIPTS—When money is paid at the office for subscription, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a bona fide acknowledgment of the receipt of their funds.

Literary Notices.

MORFITT'S CHEMICAL MANIPULATIONS.—A second and enlarged edition of this able work has just been issued by its publishers, Messrs. Lindsay & Blackiston, of Philadelphia. It is a handsome large volume, with five hundred and thirty-seven illustrations. "To realize for chemistry its true character of a science—to render it a system illustrated and proved by experiment, there is an indispensable need of proficiency in those manual operations of the laboratory, by means of which chemical changes are induced, observed, and estimated. This accomplishment in manipulation—this expertness in handling and adjusting implements, it is true, depends upon time and practice; but although the student may not become an adept in the art solely from written instructions, yet much may be thus taught which will lighten his labors, and smooth the way to the acquisition of skill and accuracy." Such, in the language of the preface, is the object of the work, and it expresses truly the nature of the work. It describes and illustrates the manipulations so clearly, that no student should be without it. In this edition, Mr. Campbell Morfitt has been assisted by his brother Clarence, assistant of Prof. Kent, United States Melter and Refiner in the Assay Office, this city.

MUSPRATT'S CHEMISTRY.—Four new numbers, 12, 13, 14, 15 and 16, of this great chemical work, have just been issued by its American publishers, C. B. Russell & Bros., No. 12 Tremont street, Boston. Two of the numbers are embellished with fine steel plate likenesses of Lavoisier and Dr. Ure It promises to be the most complete work on the Chemical Arts yet published.

THE SAWYER'S COMPANION.—This a very useful little volume, by Sanford E. Parsons, of Wilkesbarre, Pa., a practical millwright and inventor, who has been engaged for a great number of years in the business of sawmill engineering It contains instructions regarding the relation and management of all kinds of saws. In fact, it contains information on every point relating to the whole business, and just that kind required by sawyers, mill wrights and those engaged in the lumber business. It is a practical book in every sense of the term. Copies of it can be obtained at our office. Price $1.

BURTON'S PILGRIMAGE TO MECCA.—This book is full of thrilling adventure, and is one of the most interesting ever published. The author is Capt. Burton, a British officer, who impersonated a Mahommedan, and gained admission into the sacred place at Mecca. Had his disguise been discovered he would have been cut to pieces by the infuriated Musulmen. He describes, minutely, the religious ceremonies and customs of the Moslems. Published by Geo. Putnam & Co, this city.

Terms of Advertising.

Twenty-five cents a line each insertion. We respectfully request that our patrons will make their advertisements as short as possible. Engravings cannot be admitted into the advertising columns.

☞ All advertisements must be paid for before inserting.

Science and Art.

Molding and Shaping Metals.

(*Continued from fourth page.*)

Fig. 6 shows, in longitudinal vertical section, a machine for molding railway chairs, wherein provision is made for the rectilinear movement for withdrawing the pattern from the mold. The apparatus is represented as arranged for molding a pair of chairs, the flask for the tops of the chairs being shown in position.

The machine consists of the box casing, fitted with the horizontal table or plate, *b*, planed truly to form a parting surface for the mold, and formed with apertures corresponding in shape to the outline of the soles of the chair pattern, *c*. Each chair pattern is fixed on the top of a vertical spindle, *d*, which slides in guide eyes in a bracket, *e*, bolted to cross bars, *f*, attached underneath to the sides of the casing. The spindle, *d*, is in each case connected by a link, *g*, to one arm of a forked or double lever, *h*, which turns on centers or fulcra at one end of the casing, and the handle, *i*, of which passes out through a slot in the other end of that casing. Outside the casing, is a weighted lever catch, *j*, which comes under the lever handle, *i*, when this is lifted, and retains it in its elevated position until knocked away. When the chair patterns are raised to their elevated position —the exact point being determined by knife edges, *k*, which come into contact with the under side of the plate, *b*,—as much of them projects above the plate as corresponds to what is to be molded in the flask, *l*. On the patterns being so elevated, the sand is rammed into the flask, and then the patterns are withdrawn, become detached from the mold, which can then be removed without danger of injuring the sharpness of any of its parts. Holes corresponding to the spike holes are formed completely through the patterns, and rods attached to the cross bars, *f*, below, rise up to level with the plate, *b*, so as to sustain the cores of the spike holes, and prevent their being brought away by the patterns, acting also as additional guides for the patterns. The overhanging or undercut portions, *m*, may be provided for in various ways: thus, for example, they may be molded by means of loose pieces, which the patterns leave in the mold to be afterwards picked out; or the whole space of the jaw or rail seat may be filled up in the pattern, and be formed by means of a sand or iron core subsequently inserted into the mold. The reverse flask for the bottom of the chair is molded in any of the ordinary ways, and is placed upon the flask, *l*, after inverting this from the position in which it is represented in the figures, and so completes the mold.

By adopting the described arrangements for forming molds, it is asserted that the castings are turned out much cleaner and freer from blemishes than the ordinary systems now followed, so that considerable labor and expense is saved in dressing or trimming the castings, and the work is performed with greatly increased rapidity.

Fig. 7 is a transverse vertical section of the molding apparatus, as modified for forming the outer molds for cast-iron pipes. The apparatus consists of a species of box frame, *a*, the top side, *b*, of which is planed or brought to a smooth plane surface. This top side or plate, *b*, is formed with apertures exactly fitting the pipe patterns, *c*, diametrically. The flask, *d*, for the half mold of the two pipes, for molding which the apparatus is constructed, is placed upon the plate, *b*, and when the patterns, *c*, are in proper positions, the sand is rammed into this flask in the usual manner. The ends of the patterns, *c*, pass through vertical slots in the sides of boxes, fitted or formed upon the frame, *a*, at each end. Inside these boxes the patterns have upon them eccentric pieces or cams, *f*, which rest on bearing pieces capable of accurate adjustment vertically by means of wedges, *h*. At one end, the patterns extend through apertures in the outer sides of the end box, and are formed with holes for the insertion of a lever, by means of which they are turned.

The action of this apparatus is precisely the same as that of the apparatus represented in figs. 1 and 2, and already described, except that the patterns are turned by means of a simple lever—such as the rammer uses in ramming in the sand—instead of by a pinion and spur-wheel arrangement. Thus, when the projecting or higher part of the cam, *f*, is turned down, as shown at the right hand side of fig. 7, the pattern, *c*, is raised up to its highest position, and projects through the plate, *b*, to the extent of exactly half its circumference. With the patterns in this position, the flask, *d*, is rammed up, and the patterns are subsequently turned to the position shown at the left hand side of the figure, when they become quite detached from the mold, which can be removed without risk of damage. The projecting parts of the cams, *f*, are made concentric with the axes of the patterns for a certain distance, so as to keep the pattern in contact with the mold surface for a short time when the patterns are being turned, so that the turning action smooths the surface of the mold before withdrawing the patterns therefrom. Two flasks being rammed upon the patterns in this way, and being put together with suitable cores, a complete mold is formed for two lengths of piping.

The patentee describes a precisely similar arrangement for molding cannon of large size, and for molding two smaller cannons in one apparatus. The trunnions of the cannons are molded by means of loose pattern pieces, held in position by means of a loose pin entered into a hole in the pattern. When the flask is rammed the pin is withdrawn, so as to allow the pattern to turn, and the trunnion pattern is afterwards picked out of the mold.

Fig. 6.

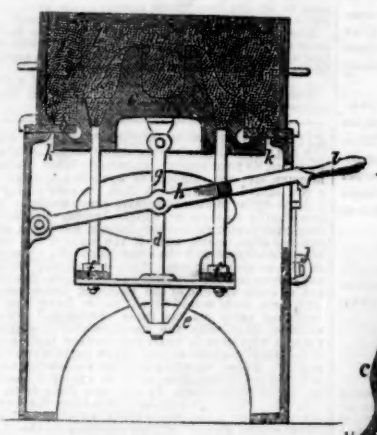


Fig. 7

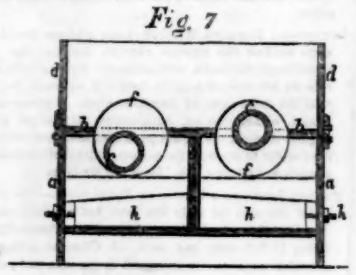


Fig. 8

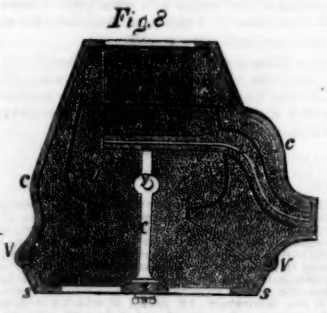


Fig. 8 is a vertical section of a mold-making machine, of precisely the same construction as that represented in figs. 1 and 2, but represented as fitted with a pattern for a kettle. The spout of the kettle is molded by means of half pattern pieces, fitted by means of pegs, or otherwise, upon the plate, *d*. The pattern spout for one half mold is placed at the other side; so that when the two half molds are brought together upon the core, the two half-spout portions will meet and form the complete spout. The core may be formed in a box, similar to that represented in fig. 3, for the pot, but it is shown as strengthened by means of a central spindle, *x*, with cross pieces *y*. The core, *z*, for the spout, is inserted in a socket formed in the side of the main core, *u*, and a wire, which strengthens the spout core, is entered into a hole in one of the cross pieces, *y*.

Bleaching Linen and Cotton.

In their natural state, linen and cotton are far from being pure white—their color is a greenish yellow. As snow white linen is delightful to the eye, the removal of its natural yellow color to render it white has occupied a place in the family arts as well as public chemical arts connected with manufacturing corporations, for centuries. This art is called bleaching, blanching, or whitening. The most early methods practised were by boiling the goods in alkaline solutions, such as barrillee, made from sea-weed, and the lye of wood ashes, and then exposing them in pieces on grass plats to sunshine and frequent wettings of water sprinkled on them—which method is termed "grass bleaching." To bleach linen by this method required months of time, and a vast outlay of capital. The discovery of *chlorine* by Scheele, the French chemist, revolutionized the whole art, and cotton and linen cloth can now be rendered white by this chemical agent in as many hours as months by the grass-bleaching process. But although the use of chlorine as a blanching agent has shortened the process from months to days and hours, yet even as the art is practiced in the best modern bleaching establishments, the manipulations to which the cloth is subjected are still numerous, and involve a great deal of what may be called "slushy labor." The apparatus illustrated on our first page last week we hope will be the means of abridging the number of manipulations, and, as a consequence, the great amount of labor involved in their performance.

The use of high pressure steam in removing the natural resin and oil in cotton cloth by the preliminary process, in what are called "bucking keers," has been found more efficient than boiling with direct fire heat.

In the apparatus referred to, the heat of steam is extended to the other processes of bleaching, with what success, experience alone can decide, and to it we direct the attention of all our bleaching establishments.

Professor Muspratt, of Liverpool, Eng., in his great work on Chemistry applied to the Arts, expresses an opinion in favor of bleaching by chlorine in a gaseous state, instead of employing it in liquors, which is the common practice. He quotes the opinion of Persoz, who states that it is preferable to employ this bleaching agent in the gaseous state. The goods, by this method, are subjected to the action of the gas in an air-tight chamber, and are bleached rapidly; but the chlorine gas has to be prepared on the premises, which thus involves considerable expense and trouble, whereas the gas is now cheaply produced in establishments that manufacture soda from sea salt, and it is preserved in dry lime, and sent to bleaching works all over the globe.

In a former volume we directed the attention of our bleachers of cotton fabrics to the well-known difference of tenacity—strength—between the bleached and unbleached cotton cloth sold in our commercial marts, and stated that many families preferred purchasing unbleached cloth, and grass-bleached it themselves, because they thereby obtained cloth of greater strength, and capable of wearing for a longer period than cloth of the same fineness bleached in public works by the chlorine processes. If the use of chlorine has shortened the bleaching processes at the expense of the strength of the fibre, then modern chemistry, as applied to this art, has not much to boast of. Works on chemistry, however, in treating this subject, affirm that chlorine bleached fabrics, are stronger than the grass-bleached. If this is true, it is a little remarkable that in some famous linen bleacheries in the north of Ireland, grass-bleaching is still practiced to some extent, and goods thus blanched bring a higher price in the market. The evidence, we think, is conclusive that most of the textile fabrics sold in the market, if not all, that are bleached by the chlorine processes, are injured in tenacity thereby. We have received letters from chemists engaged in this business, in which they have asserted that "with skill and care cotton fabrics can be bleached by chlorine without injuring their tenacity so much as by grass bleaching." This may be true; but the practice of the art is not in accordance with this theory, and it is to this we wish to direct the attention of our bleachers and manufacturers of cotton cloth, because the latter are as much, if not more interested in this question than the former.

It is not so generally known as it ought to be, that strong liquors of common chloride of lime—bleaching powder—injures the fibres of cotton goods. The oxygen that is liberated by a concentrated solution unites with the fibres of the cloth, producing an oxyd, which destroys their tenacity—burning the cloth by slow combustion. Bleaching liquor should always be applied in a very diluted state—the weaker the better for saving the strength of the fibres.

In the apparatus of Mr. Wallace, with which steam heat is designed to be used, the bleaching liquors should be made very weak, if not, they will certainly injure the strength of the cloth. We believe that 1° in Twaddle's hydrometer would be of sufficient strength.

It is very difficult to dissolve dry bleaching powder in water—particles of it are liable to float on the surface. Great care should be exercised to bray these thoroughly, for if they become attached to the cloth they are liable to eat holes in it when removed to the *sour* or acid bath. At one period, dilute sulphuric acid was only used as a sour for bleaching, but dilute hydro-chloric acid at 2° Twaddle, is more extensively used now for this purpose.